Wet Weather Team Project Meeting Materials

Summer 2007–Spring 2008

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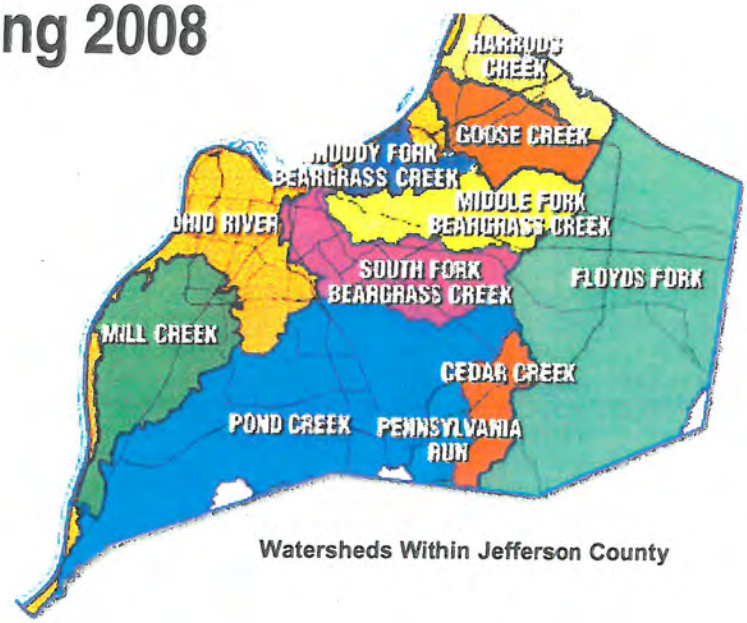
WWT Stakeholders Meeting # 19 6/19/2008

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 #19
Thursday, June 19, 2008, 4:20-8:30 PM
MSD Main Office, Board Room
700 West Liberty St., Louisville

Meeting Objectives:

- Review and discuss the draft text describing the emergent vision for MSD's Integrated Overflow Abatement Plan.
- Review and discuss the status and content of the draft Education and Outreach Plan.
- Discuss the process for the programmatic evaluation and selection of Integrated Overflow Abatement Plan alternatives.
- 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 (15 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.
4:55 PM	**Integrated Overflow Abatement Plan (IOAP) Vision Discussion (30 minutes)** • Review and discuss the draft text describing the emergent vision for MSD's Integrated Overflow Abatement Plan.
5:25 PM	**Education and Outreach Plan Discussion (45 minutes)** • Review and discuss the status and content of the draft Education and Outreach Plan.
6:10 PM	**Dinner Break (20 minutes)** *Dinner will be provided for Wet Weather Team members.*
6:30 PM	**Opportunity for Observer Comments (10 minutes)**

6:40 PM **Initial Discussion of the Programmatic Evaluation of IOAP Projects (90 minutes)**

- Review examples of how project alternatives are being evaluated and selected.
- Review the preliminary results of the prioritization of projects for the Integrated Overflow Abatement Plan.
- Introduction to financial stewardship evaluation ("knee of the curve" analysis) of the ranked list of IOAP projects.
- Preview the next steps in the programmatic analysis of IOAP projects.

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

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

- Review plans for the next Wet Weather Team meeting on Tuesday, July 15, 2008.

8:30 PM **Adjourn**

Final Meeting Summary
Wet Weather Team Meeting #19
Thursday, June 19, 2008
MSD Main Office, Louisville

The Wet Weather Team (WWT), chartered by the Louisville and Jefferson County Metropolitan Sewer District (MSD), met on June 19, 2008, at MSD's main office. The objectives of the meeting were to:

- Review and discuss the draft text describing the emergent vision for MSD's Integrated Overflow Abatement Plan (IOAP).
- Review and discuss the draft Project WIN Public Information and Outreach Plan.
- Review examples of combined sewer overflow (CSO) project alternatives, sanitary sewer overflow (SSO) project alternatives, and green infrastructure alternatives being evaluated for MSD's IOAP.
- Preview the next steps in the technical team's analysis, including the programmatic financial stewardship evaluation ("knee of the curve" analysis) of the full set of IOAP projects.

Wet Weather Project Updates and Announcements

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

- Project WIN Public Meetings: MSD completed the third series of Project WIN public meetings in May 2008. There was low attendance at the meetings, but MSD videotaped one of the meetings and will make it available on Metro TV.
- Ohio River Sweep News Release: MSD distributed a press release about the Ohio River Sweep Event on June 21, 2008. This is an example of the kind of press releases MSD regularly distributes.
- Draft TMDL for Beargrass Creek: Gary Swanson of CH2M Hill noted that the University of Kentucky submitted a draft total maximum daily load (TMDL) proposal for Beargrass Creek to the Kentucky Division of Water in May 2008. The submittal relied on a lot of modeling and analysis completed by MSD. The draft TMDL is expected to go out for public comment within two months.
- Performance Measurement Scoring Adjustments: Based on some comments from WWT stakeholders, the technical team realized that some of the performance measures being used to evaluate project alternatives did not provide a good distribution of results in certain cases. The technical team has adjusted the performance measurement matrices for the regulatory performance and public health enhancement values to adjust for these unexpected results. (The technical team had anticipated potentially needing to fine-tune the performance measurement matrices during the analysis.)
  - The regulatory performance matrix has been revised to examine overflow volume rather than stream dilution.
  - The public health performance matrix has been revised to focus on volume reduction and to consider changes in stream access when overflow locations are moved.
- Stream Restoration Allowance: Gary Swanson of CH2M Hill said that for every overflow abatement site, MSD and the technical team will incorporate an allowance in the project budget for localized stream restoration opportunities. The technical team will identify these localized opportunities for restoration based on the Beargrass Creek Ecological Reach Characterization Study completed by Redwing. This expansion in the scope of overflow abatement projects to incorporate some stream restoration is a direct response to suggestions from WWT stakeholders.

During this session, MSD Executive Director Bud Schardein also noted that he planned to dedicate more of his time in the next five years to public information and outreach activities.

Emergent Vision of MSD's Integrated Overflow Abatement Plan Discussion

Jennifer Tice of Ross & Associates described the draft document summarizing the emergent vision for MSD's Integrated Overflow Abatement Plan, and noted that the draft vision had been developed based on the vision presentation and discussion at the April 2008 WWT meeting, the vision survey distributed to the Wet Weather Team in May, and feedback the facilitation team received from WWT stakeholders. She pointed out some of the key changes and additions made to the draft vision since the survey, including the incorporation of new text describing the WWT's values and performance evaluation framework, a more accurate description of a two-year design storm for SSOs, and additional information on control options in the IOAP. Ms. Tice and Rob Greenwood of the facilitation team also reminded the group that the vision is one of four "building blocks" of consensus for the WWT process, and that the draft vision will continue to evolve through September 2008 as more information about MSD's IOAP becomes known.

Following this introduction, Gary Swanson of CH2M Hill provided additional explanation of the following three areas in the draft vision that WWT stakeholders had asked about.

- Variance: Under the Clean Water Act, permittees must achieve compliance with water quality standards or show that overflows do not cause or contribute to water quality standards violations. MSD plans to determine the levels of overflow control in the IOAP based on the values-based benefit-cost analysis, and will submit the IOAP to EPA without a request for a variance. EPA may indicate a need for a variance based on MSD's submittal, in which case a new public process regarding the variance would be initiated.
- Design Storm: Mr. Swanson explained that the technical team would determine the level of protection for individual SSOs on a site-by-site basis, according to the values-based benefit-cost analysis, but would use a two-year design storm as the minimum level of protection. (Other Cities have simply adopted a two-year design storm as the protection level for all SSOs.) As an example, if the incremental cost of a greater level of control (e.g., a five-year design storm) for a given project were small relative to the additional benefits gained in values such as regulatory performance, public health enhancement, and environmental enhancement, then that greater level of control might be selected instead of the two-year design storm.
- Three-to-One Offset: In the draft vision, MSD is proposing a three-to-one offset of new flows anticipated from development. In cases where new development would exacerbate existing overflow problems, MSD would undertake infiltration and inflow (I&I) reduction efforts to reduce existing flows in the same sewershed as the proposed development at a ratio of three gallons removed for every one gallon added from the development. There will be a fee structure for the offsets, and these fees would apply to all new development or redevelopment projects.

The facilitation team will revise the draft vision to reflect the clarifications made during the meeting, as well as additional information from the education program discussion (described below). WWT members requested that the facilitation team clearly highlight the changes made to the draft vision in future versions of the document.

Project WIN Public Information and Outreach Program Presentation

Angela Akridge of MSD gave a presentation on the public information and outreach (PIO) program planned for Project WIN and the IOAP. The presentation covered the minimum expectations for PIO set by regulatory guidance, current Project WIN outreach activities, the role of PIO in the implementation of

the IOAP, and the specific public education and outreach approaches envisioned for 2009–2024. A key role of the ongoing PIO is to ensure the sustainability of the IOAP, particularly voluntary participation in source-control solutions and continued support for financial investments. Key audiences include the general public, schools and children, and target groups such as property owners, project neighborhoods, builders, and restaurants. For the general public, MSD envisions five key outreach 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.

The Project WIN public information and outreach program uses and will continue to use a wide range of communication media. In particular, MSD proposed public information and outreach program for the IOAP includes the following elements:

- Public meetings and events;
- Enhanced web portal;
- Speaker's bureau;
- Print and electronic media;
- Recognition programs;
- Demonstration projects;
- Tours, demonstrations, and workshops;
- Enhanced school partnerships; and
- Annual monitoring of PIO effectiveness.

In response to this presentation, WWT participants provided feedback on MSD's past outreach efforts, commented on the plans for the Project WIN public information and outreach program, and offered some additional suggestions for MSD to consider. WWT comments included the following.

- Several WWT members commended MSD on its efforts to get the word out to the public and on its environmental education program. Participants suggested that people are getting the message about Project WIN, even though the turn out at Project WIN public meetings has been light. In addition, some WWT members noted that people trust and are pleased with MSD.
- Some WWT members suggested that MSD may want to consider "stepping up" its outreach and education efforts when there is a crisis. Remind people about the causes of the problem and explain how they can help reduce and prevent future problems.
- Some WWT stakeholders expressed support for the lawn sign idea, noting that it accomplishes two objectives—recognition and advertisement. The stakeholders encouraged MSD to look for other opportunities to recognize accomplishments and advertise Project WIN at the same time.
- WWT members supported the long-term focus on education of children, but also suggested that it would be useful to involve adults in activities such as monitoring, maintenance of green infrastructure projects, and stream/river cleanup events.
- Several WWT participants had suggestions for videos that MSD could develop and show on Metro TV (Channel 25) or distribute through other means. Suggestions included:
    - Showing potential disasters or other problems that could happen (e.g., water issues in Sudan) as a "hook" to get people's attention.
    - 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.
    - Show how MSD's infrastructure works and how common problems occur (e.g., when sump pumps are always running).

- Some WWT members provided specific suggestions for the evaluation efforts associated with the public information and outreach program, including:
    - Keep track of how the rain barrels distributed to property owners actually work.
    - Include questions in the customer surveys about who watches Metro TV and how people value the community's water resources.
- A few WWT stakeholders suggested considering an outreach strategy that would use "action days" to encourage people to change their behavior at certain key time (as with ozone action days). This type of 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.
- Additional suggestions for the Project WIN education and outreach plan included:
    - Establish a "block watch" style targeted outreach approach for neighborhoods associated with individual CSO or SSO areas.
    - Find key people in communities (opinion leaders) and convince them to change their behavior (e.g., use a rain barrel and/or rain garden, disconnect downspouts, etc.) and carry the message of Project WIN.
    - Consider reaching out to parents by setting up a tent or kiosk and distributing information at neighborhood sporting events for children.
    - Participate in the two existing school magnet programs for environmental education.
    - Develop a continuing education program for elected officials and other government bodies such as the Planning Commission.
    - Educate the governing boards of other cities in Jefferson County, not just Louisville.
    - Cluster demonstration projects in one spot, so that people can view and compare multiple approaches.
    - Tell people where they can get things to help reduce flows into the sewer system (e.g., rain barrels, plants for rain gardens, etc.) and how they can find contractors.
    - Regularly provide information reminding people about maintenance of rain barrels and other types of green infrastructure.
    - Consider using canoes in the creek cleanup events.
    - Distribute information through small city newsletters, in addition to larger newspapers.
    - "Piggy back" on other meetings in the community.
- A few WWT members commented that all Metro Louisville government agencies should "lead by example."

During this session, Rob Greenwood of Ross & Associates did an explicit consensus check with the group regarding MSD's education and outreach plans. All WWT members present individually expressed their comfort with the direction MSD was heading with the draft public information and outreach program.

Update on the Analysis of CSO, SSO, and Green Alternatives for the IOAP

Review of Examples of the Benefit-Cost Analysis of CSO and SSO Project Alternatives

Gary Swanson of CH2M Hill reviewed the detailed handouts showing examples of the steps in the technical team's analysis of CSO and SSO project alternatives. These handouts (separate packages for CSO projects and SSO projects) included:

- Summary tables showing the project alternatives the technical team has evaluated to date; [Note: for CSO projects, the table is labeled, "MSD LTCP Initial CSO Projects Table;" for SSO projects, the table is labeled, "Modeled 2-Year Solutions Summary Table."]
- Project fact sheets providing an overview of each project;
- Maps showing the approximate locations of the projects;
- Cluster comparison tables that summarize the benefit-cost results of all the alternatives considered for a specific CSO or SSO location;
- Performance measure matrices showing how the alternatives (for a specific CSO or SSO location) were scored in the benefit-cost analysis for the project-specific values (i.e., asset protection, environmental enhancement, eco-friendly solutions, public health enhancement, and regulatory performance); and
- Project cost summary sheets and the detailed cost entry sheets that were used to prepare the cost estimates for the project alternatives.

Gary Swanson noted that the technical team is using a standard database for estimating the costs of project alternatives that are used in the benefit-cost analysis; these cost estimates will be refined when actual project budgets are developed. During this session, Mr. Swanson also summarized the types of project alternatives that are scoring well in the benefit-cost analysis (i.e., the current preferred alternatives) for different regions of the combined sewer system. For example, in the west side, where there are large-volume CSOs, many of the preferred alternatives are storage solutions or combinations of storage and remote treatment. In the central business district, there are considerable opportunities for green solutions, since there are a lot of small CSOs as well as a lot of impervious surfaces. Preferred alternatives within Beargrass Creek watersheds also include sewer separation projects, conveyance projects, and potentially remote treatment.

Green Infrastructure Alternatives Presentation

John Lyons of Strand Associates gave a presentation that reviewed the programmatic green infrastructure components planned for the IOAP and the types of site-specific green infrastructure projects that are being evaluated. Green infrastructure program components being considered include:

- a downspout disconnect program that could reduce over 100 million gallons (MG) of flow annually if 24,000 downspouts were disconnected;
- an incentive program to support vegetated roofs;
- a rain barrel program supplying 1,000 rain barrels to residents per year that could reduce flows by 50 MG/year assuming 10 percent of residential properties participate;
- a program to identify locations for construction of dry well demonstration projects; and
- a program to increase tree canopy by 15 percent to provide 53 MG in stormwater reduction.

While the vast majority of the green infrastructure components in the IOAP are anticipated to be programmatic, the green infrastructure team is also evaluating potential site-specific green infrastructure projects to include in the IOAP. Green infrastructure projects being considered include green alleys (for CSOs 015, 53, and 121), green parking lots (biofiltration, for CSOs 53, 181, and 160), and green streets (for CSOs 121, 191, and 208). John Lyons and Gary Swanson noted that MSD is planning to be conservative with regard to the estimates of the expected benefits of green infrastructure projects included in the consent decree submittal; however, after the initial green infrastructure projects are implemented and their performance and cost effectiveness is evaluated, MSD may shift towards additional green projects for later stages of the IOAP implementation.

Next Steps in the Technical Team's Analytic Process

Gary Swanson reviewed some of the upcoming steps in the technical team's analysis, which will include:

- Completing the benefit-cost analysis of project alternatives for individual CSO and SSO locations (including evaluating project-level green solutions and additional gray solutions);
- Resizing of the "gray" solutions based on the target reductions in stormwater volume identified through the green infrastructure team's analysis; and
- Reevaluating the levels of control for the preferred alternatives (the preferred technology was selected based on the "base case" of four overflows per year for CSOs or a two-year design storm for SSOs).

Gary Swanson gave a preview of the "knee of the curve" analysis that would be presented at the next WWT meeting. The so-called "knee of the curve" graph plots the cumulative cost of all projects (the preferred alternatives for each CSO and SSO problem) on the x-axis and the benefit-cost scores of the projects on the y-axis, with the projects ordered from the highest to lowest scores. EPA's CSO Policy allows communities to determine the appropriate level of investment in overflow control based on the "knee of the curve" analysis and the total system performance, so it is possible that the preferred alternatives for certain CSOs that have very low benefit-cost scores (compared to projects to address other CSOs) will be implemented last, or may never be implemented. All SSOs, however, need to be eliminated according to the Clean Water Act. Mr. Swanson reminded the group that the benefit-cost analysis doesn't determine what is in the IOAP, but rather it provides information to support the WWT's deliberations and, ultimately, the MSD Board's decision-making about the program.

The technical team will be scheduling optional, open-house style meetings in late July or August 2008 when WWT stakeholders may look at the details of additional projects and the project alternatives considered by the technical team. These optional meetings and the detailed handouts provided at this WWT meeting are intended to help WWT stakeholders to assess whether the values-based evaluation framework has been applied consistent with the group's expectations.

Wet Weather Team Comments

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

- Some WWT participants asked about the different formatting used to show benefit-cost results in the CSO and SSO handouts, and requested that the technical team use a consistent format. Participants noted that using a standard format facilitates the WWT's understanding of the information as well as the credibility of the analysis.
- Several WWT members asked for more information about the MSD numbering system for CSOs and SSOs, and suggested that it could be useful to have a map showing the overflow locations and/or a reference guide to help readers interpret the project numbers and identify the locations of projects.
- A few WWT stakeholders commented that, based on an initial review of the detailed CSO and SSO handouts, the values-based evaluation framework is working as expected and intended.
- Some WWT members asked how the project alternatives in the detailed CSO and SSO handouts compared to the ideas the WWT has proposed for the IOAP throughout the WWT process. Gary Swanson of CH2M Hill said that the technical team is in the process of preparing a crosswalk of the WWT idea lists with the project proposals that the technical team is evaluating.
- A few WWT members suggested that $4 per square foot might not be a sufficient incentive for vegetated roofs, and noted that older roofs may not be able to hold the full load of a vegetated roof.

- A WWT participant asked about the amount of runoff that a mature tree would absorb. The technical team said that it could get that figure.
- Several WWT stakeholders asked about whether the technical team had evaluated projects that had both green and gray elements (such as using water from storage basins for irrigation, incorporating wetlands into areas, etc.). The technical team said that it was evaluating project alternatives that combine gray and green elements, including wetlands treatment. There are some challenges with using water collected in CSO storage basins without first treating it.
- A few WWT members asked about whether there was a target percentage regarding expenditures of green versus gray solutions in MSD's IOAP, and suggested that MSD might be investing too little in green infrastructure solutions. Members of the technical team and MSD responded that Louisville, unlike many other communities, has been incorporating green infrastructure at the front end of the planning process for the CSO long-term control plan. Brian Bingham of MSD also noted that the level of investment in and integration of green infrastructure in MSD's IOAP should become clearer in the next couple of WWT meetings.
- A few WWT participants noted that there are a lot of construction and development efforts planned on Main Street, and that it could be useful for MSD to take advantage of that construction work to construct the CSO solutions at lower cost, if the timing were right.

Observer Comments

An observer asked a question about the circumstances under which EPA would *not* need to request a variance if MSD were not meeting water quality standards.

Responding to the observer comment, Gary Swanson of CH2M Hill noted that EPA's CSO Policy states that if water quality standards are not met, the permittee needs to either (a) demonstrate that the overflows do not cause or contribute to the water quality standards violation or (b) show that the level of overflow control is reasonable given the benefits provided. Thus if MSD could show that the overflows are not causing the water quality standards violation, a variance may not be needed.

Wrap Up and Next Steps

- The facilitation team will revise the emergent vision draft to reflect the WWT's discussions and the additional information about the Project WIN public education and outreach plan.
- The technical team will schedule one or more optional, project-review meetings in late July or August 2008 for WWT members to review and ask questions about the technical team's analysis of project alternatives for the IOAP.
- Potential topics for the WWT's next meeting on July 15, 2008 include:
  - Update on the emergent vision for the IOAP;
  - Discussion of the draft funding plan; and
  - Review and discussion of the "knee of the curve" (financial stewardship) analysis of a preliminary ranked list of projects.

Meeting Participants

Wet Weather Team Stakeholders

Mike Ballard (alternate for Judy Nielsen), Louisville Metro Health Department
Charles Cash, Louisville Metro Planning & Design Services Department
Allan Dittmer, University of Louisville
Arnita Gadson, West Jefferson County Community Task Force and 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
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

MSD Personnel

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

Facilitation and Technical Support

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

Meeting Observers

Diane Bielo, Sanitation District No. 1 of Northern Kentucky
Jim Bruggers, Louisville Courier-Journal
Peggy Casey, Sanitation District No. 1 of Northern Kentucky
Kristen Crumpton, Tetra Tech
Henry Cubero, The Cubero Group
Samantha Davis, Louisville Metro Council, District 9
Jeff Eger, Sanitation District No. 1 of Northern Kentucky
Justin Gray, MSD
Sue Green, MSD
Jim Hagerty, Gresham Smith & Partners (GS&P)
Jill Hunt, Sanitation District No. 1 of Northern Kentucky
Tim Kraus, O'Brien & Gere
John Lyons, Strand Associates
Paul Maron, Strand Associates
William Marshall, Tetra Tech
Chad McCormick, Stantec
Maggie Mulshine, Sanitation District No. 1 of Northern Kentucky
Amanda Waters, Sanitation District No. 1 of Northern Kentucky
Gary Wolnitzek, Human Nature

Meeting Materials

- Agenda for the 6/19/08 WWT Meeting
- Summary of the 5/15/08 WWT Meeting
- WWT Meeting Schedule (updated June 2008)
- Solution Ideas List (updated June 2008)
- Education and Outreach Ideas List (updated June 2008)
- Data Requests and Monitoring Suggestions List (updated June 2008)
- Emergent Vision for MSD's Integrated Overflow Abatement Plan (June 2008 working draft)
- Compilation of Wet Weather Team Feedback on the Emergent Vision
- Project WIN Public Information and Outreach Program Presentation
- MSD News Release about 6/21/08 Ohio River Sweep
- MSD LTCP Initial CSO Projects Table
- CSO LTCP Initial Solutions Handouts for Project #L_OR_MF_015_M_13_B_A:
    - Project Fact Sheet
    - Map
    - Cluster Comparison Table
    - Benefit-Cost Tool Results (Performance Matrices)
    - Project Cost Summary Sheet and Detailed Cost Entry Sheets
- SSO Initial Solutions Handouts:
    - Middle Fork Network Branch 6 / Floyds Fork Network Branch 1 SSO Characteristics Table
    - Modeled 2-Year Solutions Summary Table
    - MSD SSS Initial Solutions Development Summary Sheet
    - Map of Middle Fork Sewershed
- Handouts for Individual SSO Projects (Projects #S_MI_MF_NB06_01_C_A, #S_MI_MF_NB06_01_C_B, #S_MI_MF_NB06_01_C_C, # S_MI_MF_NB06_03_C, and #S_MI_MF_NB06_09_C):
    - Project Fact Sheets
    - Project Cost Summary Sheets and Detailed Cost Entry Sheets
    - Cluster Comparison Tables
    - Benefit-Cost Tool Results (Performance Matrices)
- Green Infrastructure Presentation, "From Raindrops to Rivers: A Vision for Integrating Green Solutions into Stormwater Management"

Handouts

Wet Weather Team Meeting Schedule
(as of June 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	MSD Main Office, Downtown Louisville
22	Thursday, November 20, 2008	MSD Main Office, Downtown Louisville

Wet Weather Team Solution Ideas
Working Draft – June 9, 2008

The following is a list of potential "solution ideas" identified by Wet Weather Team (WWT) members that will be considered in the design of the Wet Weather Program. The list will act as a resource for the technical team as they consider project and program alternatives. These ideas were identified both at WWT meetings and through individual communications with WWT members (e.g., via e-mail). This list will remain "live" throughout the remainder of the WWT effort to capture ideas as they are shared. WWT members are encouraged to send additional ideas to the facilitation team for inclusion in this list.

New ideas will be listed under a "What's New" section at the beginning of the document for easy reference, as well as under the appropriate section later in the document. After the "What's New" list, this document is organized into three sections:

- Section I, "Project Alternatives," is organized into five sub-categories: Stormwater Best Management Practices (Non-Structural), Stormwater Best Management Practices (Structural), CSO and SSO Point Source Controls, General/Other Solutions, and Site-Specific Solutions.
- Section II, "Funding Ideas and Incentives," is organized into three sub-categories: Cost Allocation Strategies, Financial Incentives, and Funding Sources/Options.
- Section III, "Ideas Partly or Completely Outside the Scope of MSD's Wet Weather Consent Decree," includes municipal government actions that are only partly within MSD's control, MSD actions that are not related to sewer overflow issues, and green infrastructure ideas that are not directly related to sewer overflow issues.

What's New (May / June 2008)

1. (I-D-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.
2. (I-E-BGC South Fork-2) – Create a rain garden in the Germantown area to intercept stormwater flowing to a variety of minor CSOs at the old trolley turnaround.
3. (II-C-10) – Consider using requirements when needed in addition to incentives to ensure that solutions are maintained.
4. (III-A-Existing Partnerships and Programs-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.)
5. (III-A-Other Entities-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.
6. (III-A-Other Entities-15) – Work with Metro Parks to collect stormwater into a cistern at Beringer Spring.

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.]

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).
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 Wet Weather Program.
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.).
5. Encourage the use of best management practices for chemical use in lawn management practices.
    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-B-4).
7. Invite people to "join" Project WIN by installing rain gardens, rain barrels, reducing their use of lawn chemicals, etc.
    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.
2. Encourage homeowners to construct rain gardens and use rain barrels.
3. Install French drains along roads to accept stormwater runoff (see also detailed suggestions listed for Beechwood Village below).
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
5. Consider incorporating aspects of the LEED green building standards into MSD design manuals for structural BMPs.
6. Increase tree canopy.
    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.
8. Conduct demonstration projects. [Note: Overlaps with demonstration projects in Education and Outreach Ideas List.] Specific ideas for projects include:
    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.
    b. Create some sustainable lawns as pilot projects
    c. Develop a green infrastructure best management practice site similar to SD1 (Sanitation District Number 1 of Northern Kentucky).
    d. Add green demonstration/education facilities to old urban schools.
    e. Use the Butchertown Greenway Pump Station that is offline for an education and demonstration facility.
9. Plant native plants with deep root systems.
10. Maintain existing detention/retention basins – many may not function properly due to lack of maintenance.
11. Design structural stormwater best management practices to be multiple use and eco-friendly.
    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.
    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).
    a. One potential target for a downspout disconnection program could be school buildings.
    b. Yard signs similar to those used in Portland's residential Downspout Disconnection Program could be useful for education and outreach about MSD's Wet Weather Program. [Note: This idea overlaps with the Education Ideas List.] Specific ideas for signs include:
        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.
2. Increase enforcement and inspections of downspout and sump pump connections.
    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.
3. 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.
4. Repair and seal all building laterals.
5. 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.

D. General/Other Solutions

1. Leverage and coordinate the Wet Weather Program efforts with MSD's MS4 stormwater management permitting responsibilities.
2. Conduct green infrastructure demonstration projects with monitoring components built in, to help demonstrate the overall effectiveness of green infrastructure solutions.
    a. Start with small, visible projects ("quick wins" – e.g., in a particular neighborhood, near a Rubbertown plant).
3. Preserve rural character where possible.
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.
5. Do not rule out flow-reduction techniques to address SSOs for any watershed.
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.
7. Involve community members in addressing the root causes of SSOs (e.g., by working with the Metro Council, community organizers, and neighborhood groups).
8. Challenge preconceived notions of what U.S. EPA will accept in terms of the role of source control in an SSO elimination plan.
    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.
9. Consider wet weather sewer overflow control strategies that reduce future maintenance issues.
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.

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.
2. Install new sanitary lines and laterals to homes, and pumps for basement facilities when requested by the homeowner.
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.
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).
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.

6. Restore natural stream banks for the Sinking Fork north of Shelbyville Road where the big pump now sits.

Beargrass Creek – Middle Fork

1. Restore the Middle Fork between Grinstead crossing and confluence.
    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.
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.
3. Potentially develop the River Metals property (a brownfield near the Girl Scouts Building) as a storage or wetlands treatment area.
4. Establish wetlands at Seneca Park and Old Cannons Lane.
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.
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.

Beargrass Creek – South Fork

1. Restore the South Fork between I-264 and Eastern Parkway.
    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.

Beargrass Creek – Muddy Fork

1. Restore Eva Bandman Park.
    a. Convert the park into restored wetlands with a boardwalk for visitors.
    b. Include the park as part of the solution for the CSOs that discharge at the confluence by having it receive their stormwater.
2. Tie the impaired section of Beargrass Creek to newly created wetlands, near Eva Bandman Park.
3. Incorporate green infrastructure into the Arts Center.
4. Turn the MSD pump station into an interpretive center.
5. For CSOs 132, 154, and 167:

a. Conduct a concentrated effort to disconnect downspouts in this area.
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.
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.]

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.
2. Protect Floyds Fork with riparian buffers and other preservation efforts.

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.
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)
    b. The Bradley Property

II. Funding Ideas and Incentives

A. Cost Allocation Strategies

1. Equitably assign costs (focus areas for the financial equity value):
    a. Consider the burden on fixed income and low-income populations.
        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).
    c. Consider how the community develops to make sure that everyone pays into the solution.
2. Charge residences differently depending on the area of impervious surfaces on properties (and therefore the amount of stormwater runoff that would be generated).
3. Require lower development fees for areas that already have sewer capacity (e.g., urban areas in need of re-investment).
4. Bill based on increased water usage—the more you use, the higher the rate.
5. Develop an equitable plan for joint funding for permeable pavement efforts.
6. Extend MSD's senior citizen's discount program to ensure that it helps people who face financial hardship. Ideas include:
    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.
b. Create balance between what the community pays now and what the community will pay later.
c. Do not increase rates so much that they drive companies or residents to move elsewhere.
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.

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.
9. Consider charging residences that have septic tanks more on their drainage bills than other residences.

B. Funding Sources/Options

1. Consider using volunteers to reduce costs.
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.
3. Consider additional user charges that could be used as a result of adopting a different rate schedule.
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.
5. Consider not borrowing any money.
6. Balance the impact of potential financial packages on MSD's bond rating, rates, and cash flow/liquidity.

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

1. Provide incentives for "preferred" behaviors, such as:
    a. Installing/using green roofs and permeable pavement.
    b. Increasing tree canopy, changing plantings, and other activities to reduce runoff from people's yards.
    c. Reducing use of lawn chemicals.
    d. Controlling the spread of invasive species.
2. Offer incentives for developers to use cost-effective, eco-friendly solutions (e.g., low impact development techniques, stormwater best management practices).
    a. One idea for an incentive is to offer drainage credits.
        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.
    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).
3. Charge reduced wastewater rates to property owners that use eco-friendly techniques to reduce stormwater runoff.
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-5).
    a. In critical CSO neighborhoods, provide free rain barrels to people who sign the pledge.
5. Develop compensation credits to help alleviate financial burden to developers and property owners.

6. Reduce rates for houses that are certified (i.e., through inspections) as eliminating inflow from their properties into the sewer systems.
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.
    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.
9. Consider incentives for development in areas where there is less impact on the sewer system (i.e., encouraging lower impact development).
    a. There could be a role for impact fees in encouraging development in areas where there is less impact on the sewer system.
10. Consider using requirements when needed in addition to incentives to ensure that solutions are maintained.

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.
2. Require that regional detention ponds in post-developed areas provide filtration for storms that occur every two years or less.
3. Require post-development runoff to be equal to pre-development runoff.
4. Develop mandatory or alternative green solutions for development projects (e.g., by changing development codes).
5. Determine impervious surface limits for individual watersheds.
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.
7. Use wet weather capacity (instead of dry weather capacity) of the sewer system as the baseline for approving new development.
8. Develop an ordinance to address private sources of infiltration and inflow. Ideas related to a potential ordinance include:

    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.

2. Preserve existing natural systems, vegetation, and trees during development, rather than removing and rebuilding them. Take advantage of existing assets in development opportunities.
3. Look at green parking opportunities along business corridors.
4. Look at opportunities to develop more upward and infill already developed areas (i.e., increase density).
5. Develop a "complete streets" program policy to encourage "parkway-like" streets and reduce stormwater run-off.
6. Form partnerships with housing developers to minimize impervious surfaces.
7. The parking lot on Frankfort Avenue could utilize porous pavement for public parking.
8. Develop a recognition program for those who use green infrastructure.
9. Opportunities in schools:
    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).
11. Prepare a draft best management practice for developers on using green infrastructure.

Opportunities to Link MSD Efforts to Existing Partnerships and Programs

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.'
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.).
3. Integrate green projects into planning efforts 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.
5. Consider green infrastructure in the context of healthy activity improvement projects and projects that promote greater walk-ability in neighborhoods.
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.
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.)

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.
2. Partner with schools to relate students' community service efforts with green projects.
3. Coordinate with other regional entities to build a major treatment plant near the Salt River.

4. Consider linking Wet Weather Program construction projects to road construction efforts.
    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.
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.
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.
8. Coordinate with other agencies to examine the total impacts of all utility costs (water, wastewater, energy, gas) on customers.
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.
10. Form partnerships with people and agencies who work on climate change issues (e.g., the new committee in the Green City Partnership).
11. Network with partners on education activities.
12. Work with the Green City Partnership to develop potential incentives.
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.
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.
15. Work with Metro Parks to collect stormwater into a cistern at Beringer Spring.

B. MSD Actions Not Related to Sewer Overflow Issues

1. Purchase properties within the floodplain.
    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.
3. Partner with local lawn care companies to promote Louisville Green (MSD's organic fertilizer).
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).

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.
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.
3. Utilitize the open space in parks for green infrastructure.
4. Develop and educate residents about urban farming opportunities.
5. Teach and promote sensible/responsible development.
6. Require parking lots to provide shaded areas.

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.
8. Protect or improve water quality and flood control for developments.

Wet Weather Team Education and Outreach Idea List
Working Draft – June 11, 2008

The following is a list of education and outreach ideas identified by Wet Weather Team (WWT) members for consideration for the Wet Weather Program. The list will act as a resource for MSD and the technical team as they develop and refine the draft education and outreach plan for MSD's Wet Weather Program. (The focus of this list is on long-term education, outreach, and public engagement efforts, rather than near-term activities such as public meetings occurring during the WWT process.) These ideas were identified both at WWT meetings and through individual communications with WWT members (e.g., via e-mail). This list will remain "live" throughout the remainder of the WWT effort, and WWT members are encouraged to send additional ideas for this list to the facilitation team.

New ideas will be listed under a "What's New" section at the beginning of the document for easy reference, as well as under the appropriate section later in the document. The remainder of the document is organized into two main sections, Section I, which focuses on MSD Wet Weather Program education and outreach efforts, and Section 2, which covers efforts that are only partly within MSD's control.

What's New (May / June 2008)

1. (1-C-16) – Consider strategies for conducting targeted outreach and providing feedback about monitoring results to specific neighborhoods. Examples 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.
2. (1-C-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.
3. (1-C-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.
4. (1-D-7) – Establish a recognition program for neighborhood efforts to implement, maintain, and monitor green infrastructure projects.
5. (1-E-5-b) – Support a volunteer monitoring program to monitor water quality in streams across the county.
6. (1-E-6) – 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.

I. MSD Wet Weather Program 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.
2. Education efforts should be comprehensive, adequately resourced, and human scale to encourage behavior changes (e.g., stewardship practices).
3. To be successful, public involvement efforts should include:

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.

B. Audiences, Objectives, and Messages

1. Target education efforts in "critical CSO neighborhoods" and schools in those areas.
    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.
3. Make a presentation to the full Metro Council.
4. Work with schools (in conjunction with Earth Day and river/creek cleanups) to involve both students and parents.
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.)
    b. Can the "water is dirty, stay away from it" signs that EPA designated include a promise that the public can change the situation?
    c. Translate Consent Decree activities into dollar impacts for residents.
    d. Communicate that we have no choice but must comply with the requirements of the consent decree in a timely manner.
    e. Help people understand how they are connected to the problem.
    f. Help change the perception people have of streams to a positive one (people think that streams are "dead").
    g. Help people understand that green infrastructure can be incorporated into urban areas, since urban areas can be redeveloped.
    h. Craft messages explaining the importance of addressing private sources of infiltration and inflow, and people's personal responsibility for addressing it.
    i. Create community ownership of the solutions.
    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:
        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.

l. Help people understand that, even though MSD is paying the EPA Consent Decree rate surcharge, the community as a whole must help solve the problem.

m. Help people understand the differences between the combined sewer system and the sanitary sewer system.

n. Explain funding concepts and choices to the public. Showing side-by-side cost comparisons could be a particularly useful way of doing this.

o. Thoroughly explain the financial assistance component of any private infiltration and inflow reduction program.

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.

q. Educate people about the benefits of green projects that are the result of partnerships between MSD and other agencies.

6. Involve neighborhoods in identifying potential green infrastructure solutions (e.g., by having a neighborhood competition to get grassroots ideas for potential solutions).

7. Develop education programs for schools that allow children to take information home.

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.

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.

10. Conduct an aggressive education effort before instituting any new requirement that would address private-side infiltration and inflow sources.

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.

    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.

    a. Keep the message positive.

    b. Include as part of the message that the alternative to the Wet Weather Program 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.

    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").

    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.

13. Share the messages from MSD's IOAP Vision at Project WIN public meetings and with builders and other contractors.

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 Wet Weather Program and the Consent Decree. Examples include:
    a. feature articles and/or advertisements in the Courier Journal
    b. direct mail
    c. public service announcements on television
    d. radio (WLOU/WLLV 1350 and 101.3 FM for the west)
    e. e-mail lists ("UofL announcements" to University of Louisville employees, e-mail lists for Metro Council members)
    f. website(s) (provide information, as well as solicit input and questions)
    g. community meetings ("piggy back" on other events/meetings such as the Mayor's Night Out, community association meetings, Metro Council meetings, etc.)
    h. media "groundbreaking" events
    i. 5-minute DVD video (highlight the central issues and indicate the short and long-term consequences)
    j. hold a "creek concert" to raise awareness of stream issues to young people
    k. develop/use a Kentucky State Fair Exhibit (permanent or traveling)
    l. hold a speaker's forum and/or have a group of people available that could speak at community meetings and events
    m. work with the Mayor's press staff and the Louisville Metro Neighborhoods Department to get the word out
    n. hold a press conference
2. Develop/use posters and visual displays to illustrate concepts to the public and provide context to Wet Weather Program activities. Specific suggestions include:
    a. Schematic of a combined sewer overflow
    b. Schematic of sump pumps and downspouts connected to sanitary sewers
    c. Map of the combined sewer area and outfalls against blue line streams and landmarks (road system would do)
    d. Map of SSO outfalls including the sewersheds of the "big four," as above
    e. Water Quality maps from the Beargrass Creek report card, also water quality info about Ohio River related to CSO outfalls
    f. Comparison of city sewer rates indicating which cities have consent decrees
    g. Time frames for the major deliverables in the Consent Decree
    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.
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.
4. Develop a speakers bureau to attend chamber/business association meetings and other groups that use speakers.

5. Conduct demonstration projects (Note: Overlaps with demonstration projects in Solution Ideas List). Specific ideas include:
    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.
    b. Strategically place demonstration projects (e.g., porous pavement) near neighborhoods.
    c. Create some sustainable lawns as pilot projects
    d. Develop a green infrastructure best management practice site similar to SD1 (Sanitation District Number 1 of Northern Kentucky).
    e. Add green demonstration/education facilities to old urban schools.
    f. The Clifton neighborhood is motivated, so would be a good demonstration area to show the effects of behavior change.
    g. Use the Butchertown Greenway Pump Station that is offline for an education and demonstration facility.
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.
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.
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.
9. Have MSD employees be educational ambassadors, as a way of making Louisville environmentally literate.
10. Public meeting ideas:
    a. To increase attendance, consider latching onto other meetings.
    b. Ideas for places/ways to advertise the public meetings:
        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.
    d. At public meetings, consider the fact that people need time to digest information from presentations and written materials.

e. Avoid using acronyms in presentations and discussions with community members.
f. Conduct direct outreach to block watch groups, neighborhood associations, and business associations to identify neighborhood leaders.
g. Give people at least two weeks advance notice of the public meetings.
h. Have the Metro Council representative for the local area host the public meetings.
i. Hold public meetings at local schools, maybe in conjunction with other meetings that are already taking place.
j. Give information that is as specific in terms of location as possible at the 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.
l. Bring up the green aspects of the Wet Weather Program at public meetings in order to find more partners for MSD to collaborate with on green projects.

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.
12. Develop and run an information booth at selected festivals in the community (similar to the booth used for Project XL).
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.
14. Yard signs similar to those used in Portland's residential Downspout Disconnection Program could be useful for education and outreach about MSD's Wet Weather Program. [Note: Overlaps with CSO and SSO Point Source Controls in Solution Ideas List.] Specific ideas for signs include:
    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.
    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. Examples 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.
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.
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.

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

1. Influence behavior of residential and commercial landowners through education.
    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 regarding fertilizer, weed killer, and other stormwater best management practices to neighborhood groups.
d. Develop and educate residents about urban farming opportunities
e. Teach and promote sensible/responsible development.
f. Discourage chemical treatment 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).
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.).
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
5. Encourage the use of best management practices for chemical use in lawn management practices.
    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.
    a. 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.
7. Establish a recognition program for neighborhood efforts to implement, maintain, and monitor green infrastructure projects.

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 Wet Weather Program. [Note: This is also included in the Solution Ideas List.]
    a. Develop a survey instrument (potentially with a coalition of cities) and use it every year.
2. Collect baseline data, monitor performance, and ensure "high stakes accountability" for all of the education and outreach objectives of the Wet Weather Program.
    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.
4. Develop a "report card" for MSD's Wet Weather Program 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 Wet Weather Program and implementation of the consent decree.
5. Support volunteer monitoring efforts.
    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 included in the Data Requests 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 included in the Data Requests and Monitoring Suggestions List]

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 included in the Solution Ideas List.]
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 included in the Solution Ideas List.]
3. Work with other building inspectors to raise awareness of wet weather issues during inspections.
4. Create a centralized water education center, such as the Gwinnett Environmental & Heritage Center in Gwinnett County, Georgia.

Wet Weather Team Data Request and Monitoring Suggestions List
Working Draft – June 9, 2008

The following is a list of data requests and monitoring suggestions made by Wet Weather Team (WWT) members for consideration for the Wet Weather Program. This includes requests for information to support the WWT's deliberations and suggestions for the research, monitoring, and evaluation efforts associated with MSD's Wet Weather Program. These ideas were identified both at WWT meetings and through individual communications with WWT members (e.g., via e-mail). This list will remain "live" throughout the remainder of the WWT effort, and WWT members are encouraged to send additional suggestions to the facilitation team. Requests that have been responded to will be kept on this list, but marked as "Addressed." New ideas will be listed under a "What's New" section at the beginning of the document for easy reference, as well as under the appropriate section later in the document.

Note: For monitoring and evaluation suggestions related to the Wet Weather Program public education and outreach plan, please see the Wet Weather Team Education and Outreach Idea List.

What's New (May / June 2008)

1. (I-B-5) – Additional information on the effectiveness of green infrastructure solutions (e.g., websites or other resources).
2. (I-B-6) – Information on whether other communities have experienced any issues with their green infrastructure efforts (e.g., Chicago's Green Alley Program).
3. (II-A-6-b) – Support a volunteer monitoring program to monitor water quality in streams across the county.
4. (II-A-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.

I. Requests for Information to Support WWT Deliberations

A. *Requests for Information on Current Conditions*

1. Data on how fecal coliform levels change with flow volumes.
2. Data on where water quality sampling is currently done in relation to recreational areas.
3. Current data MSD has on water quality in stream reaches (as aquatic health is an issue in some, but not all, stream reaches).
4. How MSD's development fees compare to development fees in other places.
5. Specific information on the percentage of backups that are the result of MSD's activities as opposed to private property issues.
6. Cincinnati's rates before the community started to respond to its consent decree.
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 Wet Weather Program decision making. *[Note: This is an ongoing request.]*
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).

9. Data on community use of rain barrels over time in communities that have rain barrel programs.

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).
2. Quantitative information on the benefits and/or effectiveness of eco-friendly solutions currently used by MSD.
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.]*
4. Information on the costs and benefits of a regulatory approach to address private I&I as compared to other control strategies.
    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.
    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.
5. Additional information on the effectiveness of green infrastructure solutions (e.g., websites or other resources).
6. Information on whether other communities have experienced any issues with their green infrastructure efforts (e.g., Chicago's Green Alley Program).

C. Process Suggestions

1. Conduct assessments of different watersheds to find the best opportunities for green infrastructure.
2. Conduct additional analysis of the potential effects of behavior change and green infrastructure strategies at reducing flows into MSD's sewer systems.
3. Examine how choices about funding sources affect the total wastewater and stormwater rates that residents pay.
4. Provide examples illustrating the implications of different combinations of funding sources (e.g., loans, bonds, pay-as-you-go) for funding the Wet Weather Program, 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.
6. Involve experts in making financial decisions, given the relationships among the timing of projects, cash flows, bond rating, and other factors.
7. Include information on the amount of debt remaining to be paid after the Consent Decree implementation period in future funding presentations.
8. Develop a flow diagram or decision tree showing the process for identifying and selecting projects.

II. Suggestions Related to the Wet Weather Program 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 Wet Weather Program's objectives and the performance measures developed for the program. Potential new monitoring locations to consider include:
    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.
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).
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.
5. Consider whether to use EPA's quality control protocols for water quality monitoring efforts.
6. Support volunteer monitoring efforts.
    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 was also included 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 was also included in the Education and Outreach Ideas List.]

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.
2. Pick a CSO catchment area and study the effects of rain barrels and rain gardens.
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.

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.

D. Suggestions Related to the Presentation of Information in the Wet Weather Plan

1. Model the water quality benefits of stormwater reduction efforts and present this information to EPA along with the benefits of overflow abatement efforts.

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).

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).

Emergent Vision for MSD's Integrated Overflow Abatement Plan
– Working Draft Prepared for Discussion at the 6/19/08 Wet Weather Team Meeting –

This document summarizes the emergent vision for MSD's Integrated Overflow Abatement Plan, as understood by the Wet Weather Team (WWT) stakeholder group as of June 2008. This is a working draft document that will be revised and updated during the Wet Weather Team process based on stakeholder feedback and new information about the draft Plan that becomes available.

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 (IOAP) 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 (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 Beargrass Creek 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.

[Review Note: Revisions to the following two paragraphs of the emergent vision (regarding the relationship of the IOAP to other community initiatives) are on hold pending MSD discussions with Metro Louisville Government and other organizations.]

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 plans 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 Green City 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, private developers, and other entities.

The IOAP—as MSD's wet weather consent decree response—will be a federally enforceable action plan for sewer overflow abatement. By design, the IOAP will limit the scope of MSD's federally enforceable consent decree response 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).

Values-Based Evaluation Process

MSD and the Wet Weather Team vetted and agreed upon a values-based performance evaluation framework to evaluate and select alternatives for the IOAP. The Wet Weather Team identified the following eleven community values to underpin the analysis and selection of alternatives for the IOAP.

Project-Specific Values

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

Programmatic Values

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

Using this structured decision-making process as framed by the Wet Weather Team, MSD is developing and evaluating overflow abatement control options for the IOAP based on managing risks to these community values. In particular, MSD's technical team is analyzing 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). MSD and the Wet Weather Team are using 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. Discussions about total program costs and the selection of projects for the IOAP will consider, 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 can also be 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[1] 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. ***[Review Note: The potential need for a variance may emerge during EPA's and the State of Kentucky's review and approval of MSD's consent decree response. The specific conditions under which a temporary variance would be required by EPA and the State of Kentucky are not yet known. There will be additional discussion about the proposed CSO regulatory strategy and potential EPA response at the June WWT meeting.]***

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

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 will be 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 percent probability of occurring in a given year. Based on an analysis of sixty years of historical weather patterns for Jefferson County, the technical team is proposing to use a three-hour "cloud burst" storm, with a statistically anticipated rainfall of 1.8 inches, as the basis for 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 an individual SSO would be designed to protect against larger storms (e.g., a five-year storm instead of a two-year storm) if that would yield a higher benefit-cost ratio in the analysis of project alternatives.

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. The technical team is using 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 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 designed to be 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).

Driven by the values-based benefit-cost analysis, the IOAP is anticipated to reflect 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 is expected to contain programmatic green solutions that reduce flow at multiple CSO sites (e.g., a rain barrel program) and that may involve partnerships with other public and private entities.

As of June 2008, MSD's technical team is analyzing potential options to control private sources of I&I into the sanitary sewer system, including building laterals, downspouts, sump pumps, and foundation drains. Private-side I&I control is expected to be an important part of the IOAP. Options under consideration include potentially 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. Although I&I reduction is particularly relevant to SSO control (since the sanitary sewer system was not designed to accept inflow), the technical team is considering whether similar requirements should also apply to the combined sewer system.

As a guiding principle, MSD's IOAP is being developed based on front-end consideration of source control and green infrastructure. This means that more traditional "gray" infrastructure in the IOAP will be 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.

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 will include: (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 proposed adaptive management approach will allow MSD to monitor evolving weather pattern developments and adjust its plans as more data become available.

Education Plan

[Review Note: The text on the IOAP education plan below will be revised following the WWT's discussion of a draft education plan at the June WWT meeting.]

Education is critical to the long term implementation success of the IOAP. The ongoing IOAP education plan will be designed to accomplish three objectives:

1. Generate a sense of personal ownership and responsibility required for the sustainability of critical voluntary programs in the IOAP;
2. Promote public acceptance and support for the financial investments required to achieve consent decree and Clean Water Act compliance; and
3. Encourage support for other agency programs or legislation that supports overflow abatement efforts.

Education is particularly important to promote and sustain participation in green infrastructure programs (e.g., rain gardens and rain barrels) and in efforts to control private sources of I&I into the sewer system.

Future Development Considerations

Solutions in the IOAP will consider future development based on the community's long-term land-use plan, Cornerstone 2020.[2] IOAP solutions will be designed to accommodate the anticipated impacts of population growth and land-use development in that the solutions will consider the effects of growth on connections to existing infrastructure that is upstream from existing overflow points. The IOAP is not, however, 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, are not considered part of the projects in the IOAP. In summary, the solutions in the IOAP will be 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

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

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. As currently conceived, MSD proposes a three-to-one offset of wet-weather flows from new development. This means that 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 areas of the system affected by the flows from new development. MSD would 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.) As of June 2008, the MSD Board is considering the fee structure for the offset plan. ***[Review Note: Additional information about how the three-to-one offset approach would work in practice will be shared at the June WWT meeting.]***

Funding Plan

[Review Note: Revisions to the text on the IOAP funding plan are on hold pending additional information and WWT discussions on IOAP program costs, rate impacts, and financing options.]

The funding plan for the IOAP is based on the principle that rates and fees for the IOAP must pay MSD's operating costs and debt service, and must adequately maintain MSD's current bond rating. Furthermore, MSD's rates and fees must allow for continued economic development in the community. In particular, a strong local economy will be important to sustain the affordability of the IOAP. These principles for the funding plan will 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.

Preliminary estimates of IOAP costs appear to be within community tolerance for rate increases.

MSD's Integrated Overflow Abatement Plan
Compilation of Wet Weather Team Feedback on the Emergent Vision (as of June 13, 2008)

In May 2008 a survey was distributed to Wet Weather Team stakeholders to collect initial feedback about the emergent vision for MSD's Integrated Overflow Abatement Plan (IOAP). The survey was based on a presentation from the April 3, 2008 WWT meeting entitled "Emergent Vision for MSD's Consent Decree Response." As of June 13, 2008, nearly all WWT stakeholders had submitted responses to the survey. This document is a compilation of those responses.

1. Expected Water Quality Benefits of MSD's Integrated Overflow Abatement Plan

Description: The draft vision states that MSD's IOAP will result in significant water quality improvements. The expected water quality benefits include: (a) significant reductions in the peak levels of bacteria in Beargrass Creek 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 Beargrass Creek than in the Ohio River.

Responses
Very Comfortable: 6
Comfortable: 10
Uncomfortable: 1
Very uncomfortable: 0
Unsure: 0

Comments

Comment #1: When one understands that MSD's sewer overflows are not the only source of bacteria in streams, these benefits are then recognized as much greater than they may at first seem.

Comment #2: For sure, the water quality will improve, but according to one of our presentations, CSO and SSO are only 15 % of the problem in the Ohio, and there was not any data displayed about the amount of contribution of CSOs to Beargrass Creek.

Comment #3: The second sentence "significantly" qualifies the first. I'd feel better if the second sentence was the lead sentence, the first omitted, the third included, and a sentence added, perhaps from a following section, that states that water quality improvements under ambient conditions are expected from the coordination of the IOAP with water quality initiatives such as MS4 that are outside the scope of the IOAP.

2. MSD's IOAP as a Catalyst of Community Water Quality Efforts

Description: The draft vision states that 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 use the IOAP as a catalyst of broader water quality improvement efforts in the community, and the IOAP will serve as a cornerstone 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 the Mayor's Green City Initiative, the Partnership for a Green City, Metro Louisville's Municipal

Separate Storm Sewer System (MS4) discharge permit, and other initiatives of Jefferson County Public Schools, private developers, and other entities.

Responses
Very Comfortable: 4
Comfortable: 11
Uncomfortable: 1
Very uncomfortable: 0
Unsure: 1

Comments

Comment #1: This is important. The public and powers that be need to see that other actions can and should be taken beyond this effort's scope to address WQ issues that will remain even with full IOAP implementation.

Comment #2: I am dubious about the concentration or effectiveness of the other programs named. I do think private developers will do a better job in the future with this emphasis on water quality

Comment #3: What, if any, is the commitment/acknowledgement from these other initiatives that their roles in improving water quality should be actively linked with the Concent Plan for the greatest combined benefit?

Comment #4: Referencing slide 8, it seems that we are exceeding the the accepted definitions of x-yr storms in the past x years. Are the definitions of x-yr sstorms changing in the near future?

Comment #5: I think that if you are going to hang the hat on community's work, MSD should - make sure that the named agencies know that they are being so named, that MSD keeps track of those agencies activities and contributions towards water quality. To me the slide implies that MSD realizes how important source control, or reduction of non point pollution is, but with PROJECT WIN, they are going to put their funds into rebuilding the sewer system. If MSD is going to fund some of the work like Cincinnati is with an MOU that describes in detail the relationship, then it should be highlighted even more.

Comment #6: I would like to see the '8664' proposal listed as a possibility or at least a nod to not building 2 bridges. Is that possible? If you won't give me this wording, at least add SOMEWHERE "but are not limited to" or "these are some."

Comment #7: This is close but stronger words than "catalyst" and "complementary" should be used. The IOAP could be used to leverage other resources. Comprehensive watershed planning could coordinate the IOAP with various initiatives in the community that also have the potential to improve WQ. Because MSD is not solely responsible for these other initiatives, coordination and community goal-setting will be essential.

3. "Affordability" of IOAP in the Context of Community Water Quality Efforts

Description: Since overflow control alone is not sufficient to meet water quality standards (as noted in item #2 above), the draft vision states that the "affordability" of the IOAP must be viewed in the context of other, future water quality initiatives and other service needs of the community. That is, the

community's ability to pay for the IOAP must also consider the community's ability to pay for other community water quality improvement efforts and other MSD services.

Responses
Very Comfortable: 3
Comfortable: 10
Uncomfortable: 3
Very uncomfortable: 2
Unsure: 0

Note: One stakeholder marked both "uncomfortable" and "very uncomfortable."

Comments

Comment #1: The consent decree requires that the IOAP go forward. Certain WQ initiatives are important, but are not mandated by the consent decree. Therefore, though the big picture affordability cannot be ignored when pushing the IOAP forward, it necessarily must take a back seat.

Comment #2: I am uncomfortable for I fear that nearly all of MSD's capital dollars will be diverted to the IOAP with very little investment in growing the sanitary sewer system to accommodate the requirements for economic development in the next 20 years in Louisville. My understanding is a progressive community determined to grow responsibly must make certain no more than 50% of their capital dollars are devoted to the Consent Decree requirements while growth of the tax base for the community via sewer expansion should also receive approximately 50% of the capital dollars.

Comment #3: I am unclear as to where or how these pieces come together?

Comment #4: I missed this presentation at the last meeting. Define 'follow on' and 'other community water quality water quality inmprovement efforts and other MSD services'.

Comment #5: I personally think that this is a cop out. We can afford to build a 1/2 billion dollar arena, a 4 billion dollar bridge project. The bottom line is that we can pay more for protection of our streams and overall water quality. We still are way under the EPA affordability index. So I guess the big question is, who determines affordability?

Comment #6: Our discussions of affordability were not in the context of water quality. Our discussions were about how rates would compare to other cities and the EPA affordability calculation. If there were other significant initiatives actually planned and resources (counted in 100s of millions of dollars over 20 years, like the IOAP) committed to improving water quality in coordination with the IOAP, I'd be comfortable with this, but there aren't and it's wrong to imply that there are.

4. Federal Enforceability

Description: The draft vision notes that the IOAP—as MSD's wet weather consent decree response—will be a federally enforceable action plan for sewer overflow abatement. By design, the IOAP will limit the scope of MSD's federally enforceable consent decree response 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, 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).

Responses
Very Comfortable: 6
Comfortable: 9
Uncomfortable: 3
Very uncomfortable: 0
Unsure: 0

Note: One stakeholder marked both "comfortable" and "uncomfortable."

Comments

Comment #1: Although I am comfortable with MSD's response, I still feel that the community as a whole, including the City of Louisville and its citizens and patrons, have to be held accountable and responsible for their inputs to the water quality degradation. As MSD's actions and past decisions are part of the problem, so are the cumulative actions and decisions that have been made by many others in the watershed. It may not be federally enforceable, but a "good faith effort" needs to be put forth by the City, as well as its citizens, to compliment the contribution being led by MSD. I think there may be an implied sense by others that the federally enforceable action of MSD will correct the existing water quality problem in Beargrass Creek.

Comment #2: Comfortable as long as MSD adds a statement of intent to be actively involved as a leader, facilitator or clearinghouse for group participation in problem solution.

Comment #3: I still believe that if MSD adopts source control as a main way of prevention, they should be, we should be held to it. A good example could be, if an organization determines that they would like to take a reduction in their drainage fees, to implement some source control deals, they should be held accountable. If it totally separate, why put it this slide in there. It states that by design, the IOP will limit the scope. Whose design, MSD? The Wet Weather Team? Or EPA's. I also thought that was the scope of the consent decree. So why don't we just say that. The consent decree states that only SSO and CSO work can be done.

Comment #4: I regard these as weasel words for the EPA, not the community, and balanced with the weakness of the previous paragraphs, they pretty much cancel out everything that's been said. This is a caveat that MSD needs, and I accept it, but it's certainly not "visionary." Bury it somewhere, or change this to say that the IOAP outlines only those programs that respond directly to the Consent Decree; although MSD anticipates coordination of the IOAP with other WQ initiatives by the community, MSD cannot commit them in the IOAP.

5. CSO Regulatory Strategy

Description: The draft vision notes that CSOs are permitted discharges in wet weather, as long as they are managed to avoid degradation of water quality in the receiving streams. (SSOs are unauthorized discharges and must be eliminated, see item #6 below.) EPA's CSO Control Policy[1] sets specific abatement targets for CSOs. To be permitted, wet-weather CSOs must be controlled so that either water

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

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. The draft vision states that based on EPA's CSO Control Policy, MSD's strategy for controlling wet weather CSO discharges may require a temporary variance or suspension of water quality standards during wet weather. As stated in the EPA CSO Control Policy, variances are reviewable generally every three years.

Responses
Very Comfortable: 4
Comfortable: 10
Uncomfortable: 3
Very uncomfortable: 0
Unsure: 0

Comments

Comment #1: I think there has to be a limit here. A temporary variance during wet weather forever is too long. A temporary variance while a remedial plan is being implemented is o.k. Again, any future contributions of stormwater to existing problem CSO's should be disallowed. Efforts should be towards removing potential problems CSO's from the system, on a planned schedule, or as opportunities allow, the removal or reduction .of stormwater from the CSO as opportunities come up.

Comment #2: If we adopt a 2-year storm as a minimum level of protection, have we taken into consideration potential increases in storm frequency and severity due to climate change?

Comment #3: In essence, we are going to improve the situation, CSO will kick on less frequently than now, but during rain events, or sewer malfunctions, CSO's will still be a factor in our streams. It is just too expensive to get rid of all of them 100% of the time.

6. Design Storm for SSOs

Description: The draft vision proposes that the values evaluation framework will be used to determine the appropriate level of control of SSOs in MSD's Integrated Overflow Abatement Plan, while the minimum level of protection would be a two-year storm (i.e., a storm that occurs once every two years on average). This means that solutions to address an individual SSO would be designed to protect against larger storms (e.g., a five-year storm instead of a two-year storm) if that would yield a higher benefit-cost ratio in the analysis of project alternatives. As a point of reference, Atlanta, Cincinnati, and Knoxville all use a two-year design storm as the minimum protection level for SSOs.

Responses
Very Comfortable: 5
Comfortable: 10
Uncomfortable: 2
Very uncomfortable: 0
Unsure: 0

Comments

Comment #1: Obviously, careful explanation of this component will be required.

Comment #2: If a 2-year storm is acceptable in the other major cities cited above, i.e. Atlanta, Cincinnati, etc., then control for a two-year storm should be the design requirement, not a five-year storm which likely will not be affordable if frequently done.

Comment #3: Is this really a consideration for a rainfall frequency and not a storm event that has the probability of occurring once every two years?

Comment #4: It is my understanding that the definition of an 'x-yr' storm is not a 'storm that occurs every x-years on average'. Please define for the group.

Comment #5: In # 5, it states that SSO's must be eliminated. I realize that you have said that eliminate does not mean eliminate. I think we should use words that mean what they mean. Eliminate means none. How often over the past 5 years, have we had a 2 year storm. With climate change, supposedly they are going to become more frequent. I think we should give folks the facts.

7. Role of Source Control and Green Infrastructure in the IOAP

Description: The draft vision includes the guiding principle that MSD's IOAP will be developed based on front-end consideration of source control and green infrastructure. This means that more traditional "gray" infrastructure in the IOAP will be 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 infiltration and inflow (I&I). [Note: The CSO understandings document covers aspects of this point that relate to CSO control and also further describes the evaluation process for green and gray solutions. The SSO understandings document described the analysis the technical team is conducting on private-side I&I reduction approaches.]

Responses
Very Comfortable: 7
Comfortable: 9
Uncomfortable: 0
Very uncomfortable: 0
Unsure: 1

Comments

Comment #1: I believe that the WWT has been virtually unanimous in its support for this approach.

Comment #2: Some of the non-gray "solutions" are to be determined and we must be sure improvements are made which will work and meet the objectives. While "green is good" it has not been widely accepted yet and the results are totally unknown locally at this time.

Comment #3: Would like to be kept abrast of results of studies regarding the efficacy of I&I reductions.

Comment #4: I am not sure why it is ok to work on private-side I and I for SSO's, but not for CSO's?

8. Adaptive Management and Performance Monitoring

Description: The draft vision states that 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 will include: (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 infrastructure solutions, and adjusting the types and characteristics of projects planned for later phases of implementation.

Responses
Very Comfortable: 6
Comfortable: 10
Uncomfortable: 1
Very uncomfortable: 0
Unsure: 0

Comments

Comment #1: We are all paying for performance. The public deserves proof of this program's performance.

Comment #2: Right sizing of gray solutions should include a reevalution of green solutions.

Comment #3: I would not use the word elimination - it is still management

9. Public Education

Description: The draft vision states that education is critical to the success of the IOAP. The IOAP education plan will be designed to accomplish three objectives: (1) generate a sense of personal ownership and responsibility required for the sustainability of critical voluntary programs in the IOAP, (2) promote public acceptance and support for the financial investments required to achieve consent decree and Clean Water Act compliance, and (3) encourage support for other agency programs or legislation that supports overflow abatement efforts. Education is particularly important to promote and sustain participation in green infrastructure programs (e.g., rain gardens and rain barrels) and in efforts to control private sources of infiltration and inflow (I&I) into the sewer system.

Responses
Very Comfortable: 8
Comfortable: 8
Uncomfortable: 1
Very uncomfortable: 0
Unsure: 0

Comments

Comment #1: The steps outlined are very desirable and describe what we need to accomplish. I am uncertain about the community's acceptance of personal steps to be taken in the course of changing

behavior, etc. As a case in point, in many new neighborhoods, recycling is done by a very small percentage of the residents, maybe less than 5%.

Comment #2: This needs to be a particularly strong part of the IOAP but also one that engages other parts of the community rather than MSD. i.e. Much of what might be allowed through the community's Planning and Zoning processes may not be contradictory to the existing community's long range plan but may not work in concert to the objectives needed to implement the IOAP.

10. Funding Plan Principles Regarding Rates and Fees

Description: The draft vision includes the principle that rates and fees for the IOAP must pay MSD's operating costs and debt service, and must adequately maintain MSD's current bond rating. The draft vision further includes the principle that MSD's rates and fees must allow for continued economic development in the community. In particular, a strong local economy will be important to sustain the affordability of the IOAP. These principles for the funding plan will 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.

Responses
Very Comfortable: 6
Comfortable: 11
Uncomfortable: 1
Very uncomfortable: 0
Unsure: 0

Note: One stakeholder marked both "comfortable" and "uncomfortable."

Comments

Comment #1: Obviously, the tougher economic times we have again entered wil lmake this a much tougher sell than it would have been only a year ago.

Comment #2: It is refreshing to see future economic development considerations are included here in along with the requirement for funds to meet the Consent Decree capital requirements.

Comment #3: You say MSD's current bond rating, I think it should be the community's bond rating. Our community is borrowing so much money, and the MSD stuff is figured in the middle of it. I also think that MSD rates and fees are low. I have not seen any evidence that increasing the fees more would negatively impact economic development of our community. Most people are never willing to pay more taxes. I happen to believe that having clean water in our community will strengthen our economy. I also have issues with borrowing money.

11. IOAP Solutions Consider Future Development

Description: The draft vision proposes that solutions in the IOAP will consider future development based on the community's long-term land-use plan, Cornerstone 2020.[2] IOAP solutions will be designed to accommodate the anticipated impacts of population growth and land-use development in that the solutions will consider the effects of growth on connections to existing infrastructure that is upstream from existing overflow points. The IOAP is not, however, 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, are not considered part of the projects in the IOAP. In summary, the solutions in the IOAP will be 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.

Responses
Very Comfortable: 6
Comfortable: 8
Uncomfortable: 1
Very uncomfortable: 1
Unsure: 1

Comments

Comment #1: The IOAP of course must be planned to meet the requirements of the Consent Decree but MSD must have a parallel effort underway to fund the requirements to support economic development efforts for the entire county. Of course private development will be paying its portion for progress with capacity charge payments, building of all new sewers other than truck line expansions, etc.

Comment #2: I would like more discussion/explanation of this point. Who pays for new capacity? Is it guaranteed to be at least as compliant as the IOAP?

12. Wet Weather Flow Reduction from Future Development

Description: The draft vision notes that continued development in the community will require MSD to implement measures to reduce wet-weather flows. As currently conceived, MSD proposes a three-to-one offset of wet-weather flows from new development. This means that flows entering MSD's sanitary sewer systems will be reduced at a ratio of three gallons for every new gallon added. MSD would 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 is currently considering the fee structure for the offset plan.

Responses
Very Comfortable: 4
Comfortable: 11
Uncomfortable: 1
Very uncomfortable: 0
Unsure: 2

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

Note: One stakeholder marked both "comfortable" and "uncomfortable."

Comments

Comment #1: Needs to be clearly explained to the development community (and their critics).

Comment #2: I continue to struggle with understanding exactly how this will work…

Comment #3: I think in addition to the 1 to 3 offset, there needs to be a clarifying statement that no development will be approved that exceeds the wet weather capacity of the local sewers or the waste water plant that it goes to. One could define the wet weather capacity as to be able to handle a three year storm event. .

Comment #4: I'd like to know that connections won't aggravate existing SSOs. This is likely addressed by the SSO enforcement piece, but it would be a good reassurance here.

13. Other Comments and Questions

Comment #1: How will this information be used and communicated to a broader audience?

Comment #2: It is critical for MSD to plan for the progress of sanitary sewers in Louisville to support the growth of our economic base while working to meet all of the requirements of the Consent Decree over the next 15-20 years. Otherwise Louisville will become a "has been city" like Dayton instead of a "shining city on the hill" like Nashville or Raleigh.

Comment #3: I know you put in there that we reached consensus several times throughout the document. I did agree to many things, but it does not mean that I am comfortable with everything. I am comfortable enough that my voice has been heard, but I have not been won over on all items. I will not lobby to defeat the plan, and I will actively support it. But, I am not comfortable with everything in it, as you can tell from my comments.

On slide 1 - you put alleged violations - Is MSD saying that they did not violate the Clean Water act? I thought this was resolved. - I am not sure what it says, if we are spending 800 million on an alleged violation. I thought it was true that we have CSO's and they empty into Beargrass Creek.

On slide 1, I would say, reduce discharges, instead of eliminate unauthorized.

On slide 4 - I am not sure why Harrods creek does not go all the way to the county line - the red outline stops 1/2 there - that is on the picture- metro streams have some impairments. (I am not sure if any stream is totally clean. - at least the health department says all streams have impairments, so maybe the sub title is wrong it should read All Louisville Metro streams are impaired.

On Slide 12 - there should be some way to say no swimming in Jefferson County creeks. Can we put a big X through the picture?

ON slide 15, you have a book or a poster called Project Win Presents kid Win - This is the first time. I have seen that the education part was going to include writing a book. I have not seen that in any of the descriptions nor minutes of the education. I think the education program has to be much better defined.

If such a book is going to be developed, then feature it, I also think the green "martin" or turtle, is not the best logo.

On slide 17 - I think the picture of Steve Wilson's and Laura Lee Browns big building looks like a NASA launch site. If that is what we call economic vitality, I am in the wrong place. This is a very expensive project that I believe draws too much money towards it, we basically are giving our wealthiest people a tax break. The bottom line is we need a better picture to represent economic vitality. I would not use a house in Polo fields, or a picture of the new arena, or this one. Maybe something to do with renovation of a brown field? This is a hard one, how to graphically represent economic vitality.

on Page 18 - while the photo of the young child by himself by the creek is beautiful, it would be better to have a picture of a mom and kid, or dad, or family by a creek. Just as you don't want to have photos of people without life jackets, you don't want to have kids by themselves by a creek.

MSD

NEWS RELEASE

FOR IMMEDIATE RELEASE

June 17, 2008

2008 OHIO RIVER SWEEP SET FOR SATURDAY, JUNE 21

The 19th annual Ohio River Sweep is set for Saturday, June 21, from 9:00 A.M. to 1:00 P.M. More than 15,000 volunteers from Pittsburgh to Cairo, Illinois will pick up trash and debris along 1,800 miles of riverbank. Six states and 72 counties are represented.

ORSANCO (The Ohio River Valley Water Sanitation Commission) is the regional coordinator for the event. The Metropolitan Sewer District is the local coordinator with assistance from Louisville Metro Government. Local sponsorship assistance includes LG&E, Louisville Water Company and MSD. Coverage from your news staff could help promote volunteer turnout and would be greatly appreciated.

Below is a listing of the site locations in Louisville Metro:

1. Hayes Kennedy Park (Public, not manned, supplies should be picked up at Juniper Beach area)

2. Juniper Beach Area (Public)
   Lime Kiln Lane at River Road (Fire Station)

3. Cox Park (Public)

4. Eva Bandman Park (Public)

5. Riverwalk (Public)
   10th and Main Streets

6. Shawnee Park (Public)
   Broadway at the River

7. Riverview Park (Public)
   Greenwood Road and Cane Run Road

If you have questions please call Bud Schardein at 540-6346 or by cell at 552-4230. Volunteers may contact Becky Bennett at 540-6552 or Diane Secor at 540-6502.

Louisville and Jefferson County Metropolitan Sewer District
700 West Liberty Street Louisville, Kentucky 40203-1913 502-540-6000

ProjectID	Receiving Waters	ProjectType	Project Description	Project Assumptions	CSOs Associated with the Project	Capital Cost / Gallon Overflow Removed	Weight Benefit / Cost Ratio (Capitol Costs)	Present Worth Cost/ Gallon Removed	Weight Benefit / Cost Ratio (Total Present Worth Costs)
L_MI_MF_086_S_08_A_A	Middle Fork Beargrass Creek	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 390 LF of 12" pipe in street, 145 LF of 15" pipe in street, 1,205 LF of 18" pipe in street and 460 LF of 21" pipe in street.	There's approx. 38 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO086	NA	-55.65	NA	-67.65
L_MI_MF_126_M_09B_B_A	Middle Fork Beargrass Creek	Off-Line Storage	This project is to provide a 4.13 off-line storage facility consisting of a small uncovered concrete basin followed by a large earthen storage basin for CSOs 125, 126, 127 & 166. Annual volume stored is approximately 59.79 MG, operated 54 times per year.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO125, CSO126, CSO127, CSO166	$0.22	43.84	$0.21	47.11
L_MI_MF_126_M_10_B_A	Middle Fork Beargrass Creek	Treatment Facility	This project is to provide a 59.7 MGD RTB High Rate Treatment Facility for CSOs 125, 126, 127, 144 (zero AAOV) & 166. Annual volume treated is approximately 63.73 MG, operated 62 times per year.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO125, CSO126, CSO127, CSO144, CSO166	$0.64	20.43	$0.55	23.72
~~L_MI_MF_126_M_10_B_B~~	~~Middle Fork Beargrass Creek~~	~~Treatment Facility~~	~~PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS~~	~~NOT YET REVIEWED~~	~~CSO125, CSO126, CSO127, CSO166~~		~~0.00~~		~~0.00~~
L_MI_MF_126_M_13_B_A	Middle Fork Beargrass Creek	RTC with Storage	This project is to provide a 3.27 MG off-line storage facility consisting of a small uncovered concrete basin & a large earthen storage basin for CSOs 125, 126, 127 & 166 and 0.5 MG of ILS at CSO 166 using an inflatable gate	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO125, CSO126, CSO127, CSO166	$0.30	32.48	$0.00	34.58
MI_MF_127_M_09B_B_A	Middle Fork Beargrass Creek	Off-Line Storage	This project is to provide a 4.13 off-line storage facility consisting of a small open concrete basin (0.41 MG) followed by a large earthen storage basin (3.7 MG) for CSOs 125, 126, 127 & 166. Annual volume stored is approximately 59.79 MG.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO125, CSO126, CSO127, CSO166	$0.15	79.14	$0.15	81.76
L_MI_MF_127_M_10_B_A	Middle Fork Beargrass Creek	Treatment Facility	This project is to provide a 55.7 MGD RTB High Rate Treatment Facility for CSOs 125, 126, 127 & 166. Annual volume stored is approximately 63.73 MG, operated 62 times per year.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO125, CSO126, CSO127, CSO144, CSO166	$0.66	16.26	$0.59	18.36
~~L_MI_MF_127_M_10_B_B~~	~~Middle Fork Beargrass Creek~~	~~Treatment Facility~~	~~PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS~~	~~NOT YET REVIEWED~~	~~CSO125, CSO126, CSO127, CSO166~~		~~0.00~~		~~0.00~~
L_MI_MF_127_M_13_A_A	Middle Fork Beargrass Creek	Green Infrastructure with Storage	This project includes the construction of a 3.15MG offline earthen basin and a 0.016 MG bioretention basin for CSOs 125,126,127,144,166 to reduce overflow events to 2 per year, capturing 46.92 MG / year.	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO125, CSO 126, CSO 127, CSO 144, CSO 166	$0.25	49.42	$0.23	53.52
L_MI_MF_140_M_09B_B_A	Middle Fork Beargrass Creek	Off-Line Storage	This project is to provide a 0.97 MG underground covered concrete storage basin for CSOs 86 (zero AAOV) and 140 to reduce overflows to no more than 4 per year. Annual stored volume is approximately 16.53 MG; 54 operations per year.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO086, CSO140	$0.32	31.76	$0.32	31.99
~~L_MI_MF_140_M_10_B_A~~	~~Middle Fork Beargrass Creek~~	~~Treatment Facility~~	~~PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS~~	~~NOT YET REVIEWED~~	~~CSO086, CSO140~~		~~0.00~~		~~0.00~~
L_MI_MF_140_S_08_A_A	Middle Fork Beargrass Creek	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 4,185 LF of pipe in street & 6,610 LF of pipe out of street.	There's approx. 552 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO140	$0.29	42.52	$0.23	52.98
L_MI_MF_144_S_08_A_A	Middle Fork Beargrass Creek	Sewer Separation	This project includes the construction of a new water storm system consisting of 2,560 LF of 12" pipe in street, 2,060 LF of 15" pipe in street, 355 LF of 15" pipe out of street and 780 LF of 36" pipe in street.	There's approx. 102 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO144		-28.00		-34.74

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L_MI_MF_166_M_09B_B_A	Middle Fork Beargrass Creek	Off-Line Storage	This project is to provide a 5.11 MG off-line storage facility consisting of a covered concrete basin for CSOs 086, 125, 126, 127, 140, 144 & 166. Annual volume stored is approximately 76.32 MG; 54 operations per year. Facility will require a 5.1 MGD PS	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO125, CSO126, CSO127, CSO140, CSO166	$0.38	27.71	$0.34	31.07
L_MI_MF_166_M_13_B_A	Middle Fork Beargrass Creek	RTC with Storage	This project is to provide a 4.6 MG off-line storage facility consisting of a covered concrete basin for CSOs 086, 125, 126, 127, 140, 144 & 166 and 0.5 MG of ILS at CSO 166 using an inflatable gate. Annual volume stored is approximately 69.42 MG.	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSOs 086 (zero AAOV), 125, 126, 127, 140, 144 (zero AAOV) & 166	$0.42	24.78	$0.00	27.46
L_MI_MF_166_S_09A_B_A	Middle Fork Beargrass Creek	In-line Storage	This project consists of the installation of an inflatable rubber gate on the 10'-3" Beals Branch Trunk Sewer just downstream from the dam at CSO 166. The gate will be operated within MSD's RTC system.	NOT YET REVIEWED	CSO166		0.00		0.00
L_MI_MF_206_S_08_A_A	Middle Fork Beargrass Creek	Sewer Separation	This project will complete sewer separation for areas 13 - 15 and disconnect approximately 600 downspouts from the system.	Existing system consists of both storm and sanitary sewers with common manholes. CSO discharges in Cherokee Park.	CSO206	Project in-progress	Project in-progress	Project in-progress	Project in-progress
L_MU_MF_132_M_09A_B_A	Muddy Fork Beargrass Creek	In-line Storage	The project consists of the installation of an inflatable rubber gate in the 10'-11.5" x 10' Brownsboro Rd Trunk just downstream of the rack bars at CSO 132. This will allow up to 0.5 MG of storage. The project will be operated by the RTC System.	NOT YET REVIEWED	CSO132, CSO167		0.00		0.00
L_MU_MF_132_M_09B_B_A	Muddy Fork Beargrass Creek	Off-Line Storage	The project consists of the installation of an inflatable rubber gate in the 10'-11.5" x 10' Brownsboro Rd Trunk just downstream of the rack bars at CSO 132. This will allow up to 0.5 MG of storage. The project will be operated by the RTC System.	NOT YET REVIEWED	CSO132, CSO167		0.00		0.0
L_MU_MF_132_M_10_B_A	Muddy Fork Beargrass Creek	Treatment Facility	This project includes a 7.69 MG underground covered storage basin for CSOs 132 and 167. The facility will require a 7.69 MGD PS to return the stored flow back to the interceptor.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO132, CSO167	$0.21	18.73	$0.19	20.27
L_MU_MF_132_M_13_B_A	Muddy Fork Beargrass Creek	RTC with Storage	This project includes a 7.19 MG underground covered storage basin for CSOs 132 & 167. The facility will require a 7.19 MGD PS to return the stored flow back to the interceptor.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO132, CSO167	$0.62	13.29	$0.54	15.34
L_MU_MF_154_M_09B_B_A	Muddy Fork Beargrass Creek	Off-Line Storage	This project includes a 7.19 MG underground covered storage basin for CSOs 132 and 167. The facility will require a 7.19 MGD PS to return stored flow back to interceptor and a 0.5 MG ILS using an inflatable gate in the Brownsboro Road Trunk Sewer.	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO132 and 167	$0.23	16.98	$0.21	18.17
L_MU_MF_154_M_10_B_A	Muddy Fork Beargrass Creek	Treatment Facility	This project includes a 7.95 MG underground covered storage basin for CSOs 132, 154 and 167. The facility will require a 7.95 MGD PS to return the stored flow back to the interceptor.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO132, CSO154, CSO167	$0.26	22.44	$0.24	24.36
			This project is to provide a 81 MGD RTB High Rate Treatment Facility for CSOs 132, 154 and 167. Annual volume stored is approximately 153 MG, operated 58 times per year.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO132, CSO154, CSO167	$0.25	14.86	$0.22	16.49

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L_MU_MF_154_M_13_B_A	Muddy Fork Beargrass Creek	RTC with Storage	This project includes a 7.45 MG underground covered storage basin for CSOs 132, 154 and 167. The facility requires a 7.45 MGD PS to return stored flow back to interceptor and a 0.5 MG ILS using an inflatable gate in the Brownsboro Road Trunk Sewer.	Available CSS storage capacity is based on June, 2001 RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO132, CSO154, CSO167	$0.29	20.09	$0.27	21.56
L_MU_MF_154_S_09B_B_A	Muddy Fork Beargrass Creek	Off-Line Storage	This project includes a 0.17 MG underground covered storage basin for CSO 154. The facility will require a 0.17 MGD PS to return the stored flow to the interceptor.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO154	$1.50	50.50	$1.46	52.17
~~L_MU_MF_154_S_10_B_A~~	~~Muddy Fork Beargrass Creek~~	~~Treatment Facility~~	~~PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS~~	~~NOT YET REVIEWED~~	~~CSO154~~		~~0.00~~		~~0.00~~
L_OR_MF_015_M_09A_B_A	Ohio River	In-line Storage	The project consists of installation of an inflatable rubber gate in the SWO just upstream from Paddy's Run FPS and a 9MGD PS will be required for pump back via approx. 7200LF ~ 18" FM; allowing a storage vol. of 19.8MG. (Op. of Gate & PS by RTC)	NOT YET REVIEWED	CSO015, CSO191		0.00		0.00
OR_MF_015_M_09B_B_A	Ohio River	Off-Line Storage	This project includes a 45.61 MG open concrete basin for CSOs 015 and 191. The basin is located on adjacent MSD property. The facility will require a 45 MGD PS to return the stored flow back to the interceptor.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO015, CSO191	$0.20	5.64	$0.18	6.24
L_OR_MF_015_M_10_B_A	Ohio River	Treatment Facility	This project is to provide a 671.1 MGD RTB High Rate Treatment Facility for CSOs 015 and 191. Annual volume stored is approximately 527.41 MG, operated 64 times per year. The basin is located on adjacent MSD property.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO015, CSO191	$0.65	0.00	$0.56	0.00
L_OR_MF_015_M_13_B_A	Ohio River	RTC with Storage	This project includes a 25.6 MG open concrete basin for CSOs 015 and 191, incorporating 20 MG ILS between PRFPS and SGC in SWO. The basin is located east of I-264 adjacent to MSD property. The facility is gravity in-gravity out.	Available CSS storage capacity is based on June, 2001 RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO015, CSO191	$0.15	7.68	$0.13	8.36
L_OR_MF_019_S_09A_B_A	Ohio River	In-line Storage	The project consists of installation of an inflatable rubber gate in the 11.5' overflow outlet to the river just downstream from the dam at CSO 19 and will provide a storage volume of 1.8 million gallons. The project will be operated by the RTC System.	NOT YET REVIEWED	CSO019		0.00		0.00
L_OR_MF_019_S_09B_B_A	Ohio River	Off-Line Storage	This project includes a 14.54 MG underground covered concrete basin for CSO 019. The facility will require a 14.5 MGD PS to return the stored flow back to the interceptor.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO019	$0.23	6.26	$0.21	6.85

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L_OR_MF_019_S_10_B_A	Ohio River	Treatment Facility	This project is to provide an above-grade 108 MGD Treatment Facility and a below-grade 10 MG off-line concrete storage. The average annual volume of captured CSO is ~298 MG.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO019	$0.57	0.00	$0.49	0.00
L_OR_MF_019_S_13_B_A	Ohio River	RTC with Storage	This project includes a 12.7 MG underground covered concrete basin for CSO 019. The facility will require a 14.5 MGD PS to return the stored flow back to the interceptor. Project also includes 1.8 MG of ILS using an inflatable gate.	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO019	$0.22	6.35	$0.21	6.90
L_OR_MF_020_M_04_B_A	Ohio River	Flow Control	The RTC Program identified a flow control program for the Starkey PS and CSOs 20 & 62 for an estimated cost of $512,000 (2003 $s).	NOT YET REVIEWED	CSO020, CSO062		0.00		0.00
L_OR_MF_026_S_08_A_A	Ohio River	Sewer Separation	This project include construction of a new storm sewer system consisting of 300 LF of 15" pipe in street plus 20 LF of 30" pipe in street.	There's approx. 36 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO026		-172.61		-219.30
L_OR_MF_027_M_09A_B_A	Ohio River	In-line Storage	NOT YET REVIEWED	NOT YET REVIEWED	CSO026, CSO027, CSO028, CSO029, CSO030, CSO031, CSO033, CSO034, CSO035, CSO036, CSO038, CSO178, CSO181, CSO192, CSO193, CSO195, CSO196, CSO197, CSO198, CSO199, CSO200, CSO201, CSO202, CSO203		0.00		0.00
L_OR_MF_027_M_09B_B_A	Ohio River	Off-Line Storage	This project includes a 1.21 MG underground covered concrete basin for Central Relief Drain CSO's. The basin is located beneath MSD HQ parking lot. The facility will require a 1.2 MGD PS to return the stored flow back to the interceptor.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO026, CSO027, CSO028, CSO029, CSO030, CSO031, CSO033, CSO034, CSO035, CSO036, CSO038, CSO178, CSO181, CSO192, CSO193, CSO195, CSO196, CSO197, CSO198, CSO199, CSO200, CSO201, CSO202, CSO203	$0.53	70.43	$0.50	74.77
L_OR_MF_027_M_10_B_A	Ohio River	Treatment Facility	PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	CSO026, CSO027, CSO028, CSO029, CSO030, CSO031, CSO033, CSO034, CSO035, CSO036, CSO038, CSO178, CSO181, CSO192, CSO193, CSO195, CSO196, CSO197, CSO198, CSO199, CSO200, CSO201, CSO202, CSO203		0.00		0.00
L_OR_MF_027_S_08_A_A	Ohio River	Sewer Separation	This project includes construction of a new storm sewer system consisting of 135 LF of 15" pipe in street plus 70 LF of 30" pipe in street.	There's approx. 13 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO027		-175.73		-223.04
L_OR_MF_028_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 180 LF of 15" pipe in street plus 490 LF of 15" pipe out of street.	There's approx. 28 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO028		-194.58		-242.12

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L_OR_MF_029_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 1,675 LF of 15" pipe in street plus 2,110 LF of 15" pipe out of street. It also consists of 925 LF of 21" pipe in street.	There's approx. 121 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO029	$0.44	54.68	$0.36	67.97
L_OR_MF_030_S_08_A_A	Ohio River	Sewer Separation	Project includes construction of a new storm sewer system consisting of 785 LF of 12" pipe in st, 1,125 LF of 12" pipe out of st, 175 LF of 18" pipe in st, 775 LF of 18" pipe out of st, 190 LF of 24" pipe in st plus 340 LF of 24" pipe out of st.	There's approx. 27 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO030	$0.23	112.30	$0.19	136.85
L_OR_MF_031_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 140 LF of 15" pipe in street.	There's approx. 25 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO031		-221.11		-268.89
L_OR_MF_033_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 355 LF of 15" pipe in street plus 825 LF of 18" pipe in street.	There's approx. 27 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO033	$13.55		$10.85	
L_OR_MF_034_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 735 LF of 15" pipe in street plus 15 LF of 15" pipe out of street.	There's approx. 23 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO034		-88.45		-111.94
L_OR_MF_035_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 1,875 LF of 15" pipe in street plus 985 LF of 15" pipe out of street.	There's approx. 39 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO035	$6.48	33.79	$5.20	42.14
L_OR_MF_036_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 1,870 LF of 15" pipe in street, 450 LF of 15" pipe out of street, 1,030 LF of 18" pipe in street and 735 LF of 21" pipe in street.	There's approx. 59 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO036	$116.14	-27.55	$92.68	-34.53
L_OR_MF_038_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 1,235 LF of 15" pipe in street plus 905 LF of 18" pipe in street.	There's approx. 20 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO038		-39.79		-50.21
L_OR_MF_050_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 4,715 LF of 15" pipe in street plus 475 LF of 15" pipe out of street.	There's approx. 109 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO050	$0.08	102.17	$0.07	124.16
L_OR_MF_051_S_08_A_A	Ohio River	Sewer Separation	Project includes construction of a new sanitary & storm sewer system. The sanitary system consists of 30 LF of 8" pipe in street plus 195 LF of 8" pipe out of street. The storm system consists of 120 LF of 12" pipe in St. plus 235 LF of 12" pipe out of St	There's approx. 45 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO051	$0.09	95.85	$0.07	120.50
L_OR_MF_052_S_08_A_A	Ohio River	Sewer Separation	Project includes construction of a new sanitary and storm sewer system. The sanitary system consists of 170 LF of 6" pipe in street plus 490 LF of 15" pipe in st. The storm system consists of 360 LF of 15" pipe in st plus 290 LF of 15" pipe out of st	There's approx. 31 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO052	$0.13	114.62	$0.10	144.86
L_OR_MF_053_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of both a new sanitary sewer system and a new storm sewer system. The sanitary system consists of 15 LF of 36" pipe in street. The storm system consists of 10 LF of 36" pipe in street.	There's approx. 103 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO053	$0.13	303.63	$0.12	349.81

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L_OR_MF_054_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 340 LF of 15" pipe in street plus 1,135 LF of 15" pipe out of street.	There's approx. 54 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO054	$5.59	149.69	$4.50	185.73
L_OR_MF_055_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new sanitary sewer system consisting of 55 LF of 15" pipe in street.	There's approx. 73 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO055	$0.02	382.21	$0.01	488.67
L_OR_MF_056_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new sanitary sewer system consisting of 130 LF of 10" pipe in street, 780 LF of 10" pipe out of street, 385 LF of 12" pipe in street and 325 LF of 12" pipe out of street.	There's approx. 85 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO056	$0.41	23.00	$0.33	28.97
L_OR_MF_057_M_09B_B_A	Ohio River	Off-Line Storage	This project includes a 0.02 MG underground covered concrete basin for CSO's 057, 160, and 161. The basin is located beneath a parking lot on 1st St between Market and Main Streets.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO057, CSO160, CSO161	$10.13	84.64	$8.33	102.89
L_OR_MF_058_S_08_A_A	Ohio River	Sewer Separation	This project is a complete sewer separation project for the CSO 58 service area. The project will consist of the construction of 2,000 LF of new storm sewers and the conversion of the ex. combined sewer to a sanitary sewer with elimination of the CSO.	There's approx. 297 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO058	$0.02	199.32	$0.01	252.69
L_OR_MF_058_S_09B_B_A	Ohio River	Off-Line Storage	This project includes a 5.22 MG covered concrete basin for CSO 058. The basin is located near the 4th St PS. The facility will be gravity in-gravity out operation.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO058	$0.19	14.79	$0.18	15.75
L_OR_MF_104_M_09B_B_A	Ohio River	Off-Line Storage	This project includes a 13.06 MG underground covered concrete basin for CSOs 104, 105, and 189. The facility will require a 13 MGD PS to return the stored flow back to the interceptor.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO104, CSO105, CSO189	$0.35	6.01	$0.32	6.64
L_OR_MF_104_M_10_B_A	Ohio River	Treatment Facility	This project includes a 13.06 MG underground covered concrete basin for CSOs 104, 105, and 189. The facility will require a 13 MGD PS to return the stored flow back to the interceptor.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO104, CSO105, CSO189	$0.41	0.00	$0.36	0.00
L_OR_MF_104_M_13_B_A	Ohio River	RTC with Storage	This project includes a 4.26 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 inflatable gates. The facility will require a 4.26 MGD PS to return stored flow back to interceptor.	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO104, CSO105, CSO189	$0.20	10.85	$0.18	11.96

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L_OR_MF_105_M_04_B_A	Ohio River	Flow Control	Project identified in the RTC Program and includes a new 60" sluice gate on the Western Interceptor to maximized intercepted flow going to the MFWTP for an estimated cost of $580,000 (2003 $s).	NOT YET REVIEWED	CSO104, CSO105		0.00		0.00
L_OR_MF_105_M_09A_B_A	Ohio River	In-line Storage	The project consists of the replacement of the ex. 108"x108" flood control sluice gate 90 in the Western Outfall and a 50 gpm pump back station w/ 800 LF of FM, allowing a storage vol. of 3.8MG. The gate and PS will be operated by the RTC Program.	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction.	CSO104, CSO105		0.00		0.00
L_OR_MF_105_M_09B_B_A	Ohio River	Off-Line Storage	This project is to provide a 20 MG, underground, off-line, covered storage basin to reduce overflows at CSOs 104 and 105 to no more than 4 per year. Annual volume stored is approximately 340 MG.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO104, CSO105	$0.89	17.48	$0.83	18.68
L_OR_MF_105_M_10_B_A	Ohio River	Treatment Facility	The 1997 LTCP identified a 20 MGD treatment facility near the CSOs in Shawnee Park for an estimated cost of $7,434,000 (1997 $s).	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4 hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO104, CSO105	$1.11	0.00	$0.98	0.00
L_OR_MF_150_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 80 LF of 12" pipe in street, 175 LF of 12" pipe out of street and 405 LF of 30" pipe in street.	There's approx. 10 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO150	$0.08	198.47	$0.07	239.05
L_OR_MF_156_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 2,925 of 12" pipe in street and 75 LF of 15" pipe in street.	NOT YET REVIEWED	CSO156	$22.69	22.53	$18.80	27.19
L_OR_MF_160_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 425 LF of 15" pipe in street.	There's approx. 15 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO160	$1.59	85.30	$1.25	108.20
L_OR_MF_161_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 700 LF of a 12" pipe in street.	There's approx. 18 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO161	$70.02	199.94	$55.28	253.26
L_OR_MF_172_M_09B_B_A	Ohio River	Off-Line Storage	This project includes a 8.36 MG underground covered concrete basin for CSOs 132, 154, 167, and 172. The facility will be gravity in-gravity out operation.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO132, CSO154, CSO167, CSO172	$0.22	17.14	$0.20	18.81
~~L_OR_MF_172_M_10_B_A~~	~~Ohio River~~	~~Treatment Facility~~	~~PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS~~	~~NOT YET REVIEWED~~	~~CSO132, CSO154, CSO167, CSO172~~		~~0.00~~		~~0.00~~
L_OR_MF_172_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 695 LF of 12" pipe in street, 155 LF of 12" pipe out of street, 1,110 LF of 18" pipe in street and 795 LF of 54" pipe in street.	There's approx. 12 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO172	$1.26	22.36	$1.86	28.05

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L_OR_MF_172_S_09B_B_A	Ohio River	Off-Line Storage	This project includes a 0.08 MG underground covered concrete basin for CSO 172. The facility will be gravity in-gravity out operation.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO172	$0.51	93.59	$0.51	94.45
L_OR_MF_172_S_10_B_A	Ohio River	Treatment Facility	PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	CSO172		0.00		0.00
L_OR_MF_178_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 2,050 LF of 12" pipe in street, 95 LF of 12" pipe out of street, 2,660 LF of 15" pipe in street and 475 LF of 18" pipe in street.	There's approx. 13 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO178	$5.88	41.36	$4.75	51.18
L_OR_MF_181_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 2,425 LF of 12" pipe in street, 15 LF of 12" pipe out of street, 845 LF of 15" pipe in street, 1,035 LF of 27" pipe in street and 75 LF of 72" pipe in street.	There's approx. 51 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO181	$275.53	7.26	$219.39	9.12
L_OR_MF_189_S_09A_B_A	Ohio River	In-line Storage	The project consists of the replacement of the ex. 132"x120" flood control sluice gate (Gate 85) in the overflow outlet to the river from the Northwestern Interceptor allowing up to 5mg of storage volume. The gate will be operated by the RTC Program.	NOT YET REVIEWED	CSO189		0.00		0.00
L_OR_MF_189_S_09B_B_A	Ohio River	Off-Line Storage	This project includes a 11.22 MG underground covered concrete basin for CSO 189. The basin is located in Shawnee Park. The project includes an 11.25 MGD pump out facility. Project also includes $168,000 for 300 LF 12" auger bore ($561/LF).	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO189	$0.31	7.39	$0.29	8.03
L_OR_MF_189_S_10_B_A	Ohio River	Treatment Facility	This project includes a 110 MGD Retention Treatment Basin plant for CSO 189 based on the 5th highest flow rate. The facility will require a 110 MGD PS to pump into the RTB plant.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO189	$0.11	4.19	$0.10	4.75
L_OR_MF_189_S_13_B_A	Ohio River	RTC with Storage	This project includes a 6.22 MG underground covered concrete basin for CSO 189 and 5.0 MG of ILS using an inflatable gate in the Northwestern Interceptor. The project includes an 6.25 MGD pump out facility.	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO189	$0.22	8.35	$0.20	8.94
L_OR_MF_190_S_09B_B_A	Ohio River	Off-Line Storage	This project includes a 1.95 MG underground covered concrete basin for CSO 190. The basin is located in a vacant lot near I-64. The project includes a 2 MGD pump out facility.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO190	$0.30	23.92	$0.28	25.27

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L_OR_MF_190_S_10_B_A	Ohio River	Treatment Facility	This project is to provide a 27 MGD RTB High Rate Treatment Facility for CSO 190. The basin is located in a vacant lot near I-64. Annual volume stored is approximately 36 MG operated 50 times per year.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO190	$0.48	0.00	$0.43	0.00
L_OR_MF_192_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 75 LF of 12" pipe in street, 35 LF of 12" pipe out of street, and 530 LF of 15" pipe in street.	There's approx. 64 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO192		-62.14		-76.19
L_OR_MF_193_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 2,920 LF of 15" pipe in street.	There's approx. 104 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO193	$48.32	91.07	$38.43	114.51
L_OR_MF_195_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 800 LF of 15" pipe in street.	There's approx. 36 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO195	$0.35	56.77	$0.28	71.85
L_OR_MF_196_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 45 LF of 15" pipe in street.	There's approx. 17 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO196	$0.92	268.38	$0.75	328.03
_OR_MF_197_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 30 LF of 15" pipe in street.	There's approx. 26 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO197	$0.07	285.88	$0.06	330.63
L_OR_MF_198_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 145 LF 15" pipe in street.	There's approx. 13 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO198	$412.73	31.97	$362.67	36.38
L_OR_MF_199_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 410 LF of 15" pipe in street.	There's approx. 33 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO199	$1.16	339.86	$0.95	415.61
L_OR_MF_200_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 595 LF of 15" pipe in street.	There's approx. 27 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO200	$2.48	84.18	$1.95	106.78
L_OR_MF_201_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 630 LF of 15" pipe in street and 830 LF of 15" pipe out of street.	There's approx. 25 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO201		157.29		195.81
L_OR_MF_202_S_08_A_A	Ohio River	Sewer Separation	This project is a complete sewer separation project for the CSO 202 service area. The project will consist of the construction of a new storm sewer system and the conversion of the existing combined sewer to a sanitary sewer with elimination of the CSO.	There's approx. 29 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO202		0.00		0.00
L_OR_MF_203_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 545 LF of 15" pipe in street and 1,450 LF of 15" pipe out of street.	There's approx. 38 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO203		134.74		166.20

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L_OR_MF_208_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 270 LF of 12" pipe in street.	There's approx. 4 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO208	$1.04	459.83	$0.82	585.41
L_OR_MF_211_M_09B_B_A	Ohio River	Off-Line Storage	This project includes a 40.07 MG underground open concrete basin for CSOs 016, 210, and 211. The basin is located on MSD property near I-264. The facility will be a gravity in-gravity out operation.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO016, CSO210, CSO211	$0.09	16.34	$0.08	18.24
L_OR_MF_211_M_10_B_A	Ohio River	Treatment Facility	The 1997 LTCP for Regions 2&3 identified a 150 MGD treatment facility to be located in Shawnee Park just north of Broadway at an estimated cost of $38,725,000 (1997 $s).	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO016, CSO210, CSO211	$0.21	0.00	$0.19	0.00
L_OR_MF_211_M_13_B_A	Ohio River	RTC with Storage	This project includes a 23.97 MG underground open concrete basin for CSOs 016, 210, and 211. 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.	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO016, CSO210, CSO211	$0.09	16.60	$0.08	18.37
L_OR_MF_211_S_09A_B_A	Ohio River	In-line Storage	This project consists of the installation of an inflatable rubber gate in the Southern Outfall just upstream of the Main Diversion Structure and provide 11.4 MG of storage. The gate will be operated by the RTC Program.	NOT YET REVIEWED	CSO211	$0.02	0.00	$0.01	0.00
L_OR_MF_211_S_09A_B_B	Ohio River	In-line Storage	The project consists of installation of an inflatable rubber gate in the Southern Outfall (approx. 7,400 LF upstream from the MDS) and will provide a storage volume of 4.7 million gallons. The gate will be operated by the RTC Program.	NOT YET REVIEWED	CSO211		0.00		0.00
L_OR_MF_211_S_09B_B_A	Ohio River	Off-Line Storage	This project includes a 27.5 MG underground open concrete basin for CSO 211. The basin is on MSD property near I-264. The facility is a gravity in-gravity out operations.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO211	$0.16	7.28	$0.14	8.48
~~L_OR_MF_211_S_10_B_A~~	~~Ohio River~~	~~Treatment Facility~~	~~PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS~~	~~NOT YET REVIEWED~~	~~CSO211~~		~~0.00~~		~~0.00~~
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L_SO_MF_018_M_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	This proposed project includes a 2.42 MG underground closed off-line storage basin to be located in an open field adjacent to CSO 018 and the Nightingale PS. The basin will be feed by gravity and have a small PS and FM to empty the basin over a 24-HR period.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO018, CSO108, CSO109	$0.45	26.93	$0.41	29.38
L_SO_MF_018_M_10_B_A	South Fork Beargrass Creek	Treatment Facility	0	0	CSO018, CSO108, CSO109	$1.85	3.78	$1.57	4.43

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L_SO_MF_082_M_09B_B_B	South Fork Beargrass Creek	Flow Diversion	This project includes a 2.04 MG underground covered storage basin for CSOs 082, 120, 121 and 153. The facility will require a 2.04 MGD pump station to return the stored flow to the interceptor over a 24 hour period.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO082, CSO083, CSO084, CSO091, CSO092, CSO110, CSO111, CSO113, CSO117, CSO118, CSO119, CSO120, CSO121, CSO141, CSO146, CSO148, CSO149, CSO151, CSO152, CSO153, CSO179	$0.42	37.95	$0.39	41.24
~~L_SO_MF_082_M_10_B_A~~	~~South Fork Beargrass Creek~~	~~Treatment Facility~~	~~PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS~~	~~NOT YET REVIEWED~~	~~CSO082, CSO083, CSO084, CSO091, CSO092, CSO110, CSO111, CSO113, CSO117, CSO118, CSO119, CSO120, CSO121, CSO141, CSO146, CSO148, CSO149, CSO151, CSO152, CSO153, CSO179~~		~~0.00~~		~~0.00~~
~~L_SO_MF_082_M_10_B_B~~	~~South Fork Beargrass Creek~~	~~Treatment Facility~~	~~PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS~~	~~NOT YET REVIEWED~~	~~CSO082, CSO120, CSO121, CSO152~~		~~0.00~~		~~0.00~~
L_SO_MF_082_M_10_B_A	South Fork Beargrass Creek	Treatment Facility	PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	CSO082, CSO083, CSO084, CSO091, CSO092, CSO110, CSO111, CSO113, CSO117, CSO118, CSO119, CSO120, CSO121, CSO141, CSO146, CSO148, CSO149, CSO151, CSO152, CSO153, CSO179		0.00		0.00
L_SO_MF_082_M_10_B_B	South Fork Beargrass Creek	Treatment Facility	PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	CSO082, CSO120, CSO121, CSO152		0.00		0.00
SO_MF_082_M_10_B_C	South Fork Beargrass Creek	Treatment Facility	PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	CSO082, CSO083, CSO084, CSO091, CSO092, CSO097, CSO106, CSO108, CSO109, CSO110, CSO111, CSO113, CSO117, CSO118, CSO119, CSO120, CSO121, CSO137, CSO141, CSO142, CSO146, CSO148, CSO149, CSO151, CSO152, CSO153, CSO174, CSO179, CSO180, CSO182, CSO183, CSO184,	$0.31	37.53	$0.28	41.77
L_SO_MF_083_M_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	This project includes an 9.46 MG off-line covered storage basin for CSOs 83, 84, 118, 119, 120, 121, 141, 153 & 082 to reduce overflows to no more than 4 per year. The basin will require an 9.46 MGD PS.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO082, CSO083, CSO084, CSO118, CSO119, CSO120, CSO121, CSO141, CSO153	$0.05	16.14	$0.04	17.90
L_SO_MF_083_M_10_B_A	South Fork Beargrass Creek	Treatment Facility	This project is to provide an above-grade 8.5 MGD BF High Rate Treatment Facility and a below-grade 11.5 MG off-line storage basin CSOs 84, 118, 119, 120, 121, 141, 153. The BF AAOV of captured CSO is ~171 MG.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO082, CSO083, CSO084, CSO118, CSO119, CSO120, CSO121, CSO141, CSO153	$0.33	29.07	$0.00	32.10
L_SO_MF_083_M_13_B_A	South Fork Beargrass Creek	RTC with Storage	This project includes an 8.66 MG off-line covered storage basin for CSOs 83, 84, 118, 119, 120, 121, 141, 153 & 082 and 0.8 MG of ILS at CSO 118. The basin will require an 8.66 MGD PS to return the stored flow to the interceptor after the event.	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO082, CSO083, CSO084, CSO118, CSO119, CSO120, CSO121, CSO141, CSO153	$0.61	-17.18	$0.49	-19.82
L_SO_MF_091_S_08_A_A	South Fork Beargrass Creek	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 580 LF of 12" pipe in street, 1,100 LF of 12" pipe out of street and 20 LF of 24" pipe in street.	There's approx. 155 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO091	$0.25	27.33	$0.23	29.82
~~L_SO_MF_092_M_09B_B_A~~	~~South Fork Beargrass Creek~~	~~Off-Line Storage~~	~~This project is to provide a 2.11 MG, covered, off-line storage basin to reduce overflows at CSOs 92, 113, and 152 to no more than 4 per year. Annual volume stored is approximately 40.43 MG.~~	~~Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.~~	~~CSO092, CSO113, CSO146, CSO152~~	~~0.2648~~	~~30.68~~	~~0.244~~	~~33.31~~

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~~L_SO_MF_092_M_09B_B_B~~	~~South Fork Beargrass Creek~~	~~Off-Line Storage~~	~~This project includes a 4.42 MG underground covered storage basin for CSOs 113 and 152. The facility will require a 4.42 MGD PS to return stored flow to the BGI over a 24 hour period. (CSO 92 has 0 AAOV)~~	~~Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.~~	~~CSO092, CSO113, CSO152~~	~~0.2639~~	~~48.99~~	~~0.239~~	~~54.10~~
L_SO_MF_092_M_09B_B_C	South Fork Beargrass Creek	Off-Line Storage	This project includes a 13.09 MG underground covered storage basin for CSOs 113, 152 149, & 117. The facility will require a 13.09 MGD PS to return stored flow to the BGI over a 24 hour period. (CSOs 92 & 179 have 0 AAOV)	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO092, CS0113, CSO117, CSO142, CSO149, CSO152, CSO174, CSO179, CSO180, CSO182, CSO183, CSO184, CSO185, CSO186, CSO187, CSO188, CSO205		0.00		0.00
L_SO_MF_092_M_10_B_A	South Fork Beargrass Creek	Treatment Facility	PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	CSO092, CSO113, CSO152		0.00		0.00
L_SO_MF_092_M_10_B_B	South Fork Beargrass Creek	Treatment Facility	PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	CSO092, CS0113, CSO117, CSO142, CSO149, CSO152, CSO174, CSO179, CSO180, CSO182, CSO183, CSO184, CSO185, CSO186, CSO187, CSO188, CSO205	$0.41	0.00	$0.00	0.00
L_SO_MF_092_M_13_B_A	South Fork Beargrass Creek	RTC with Storage	This project includes a 9.89 MG underground covered storage basin for CSOs 113, 152 149, & 117 and 3.2 MG of ILS at CSO 117. The facility will require a 19.89 MGD PS to return stored flow to the BGI.	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO113, CSO117, CSO149, CSO152		-50.23		-57.95
L_SO_MF_092_S_08_A_A	South Fork Beargrass Creek	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 970 LF of 12" pipe in street plus 665 LF of 12" pipe out of street.	There's approx. 81 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO092	$1.13	60.72	$0.92	74.29
L_SO_MF_093_S_08_A_A	South Fork Beargrass Creek	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 2,905 LF of 12" pipe in street plus 350 LF of 12" out of street.	There's approx. 87 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO093	$0.49	53.04	$0.47	55.2
L_SO_MF_097_M_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	This project includes the construction of a 0.98 MG off-line underground covered storage basin for CSOs 97, 106 & 137. The facility will require 0.98 MGD effluent PS to return the stored flow to the interceptor over a 24 hour time period.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO097, CSO106, CSO137	$0.35	31.80	$0.32	35.53
L_SO_MF_097_M_09B_B_B	South Fork Beargrass Creek	Off-Line Storage	This project includes the construction of an 6.73 MG off-line underground storage basin for CSOs 097, 108, 109, 110, 111, 148 & 151. The facility will require an 6.73 MGD effluent PS to return the stored flow to the interceptor over a 24-hour period.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO018, CSO097, CSO106, CSO108, CSO109, CSO110, CSO111, CSO137, CSO148, CSO151	$0.29	30.19	$0.27	33.20
L_SO_MF_097_M_09B_B_C	South Fork Beargrass Creek	Off-Line Storage	This project includes the construction of an 5.85 MG off-line underground storage basin for CSOs 097, 110, & 151. The facility will require an 5.85 MGD effluent PS to return the stored flow to the interceptor over a 24-hour period.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO097, CSO110, CSO151	$0.61	21.83	$0.55	24.35
L_SO_MF_097_M_10_B_A	South Fork Beargrass Creek	Treatment Facility	This project includes the construction of a 0.98 MG off-line underground covered storage basin for CSOs 97, 106 & 137. The facility will require 0.98 MGD effluent PS to return the stored flow to the interceptor over a 24 hour time period.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO097, CSO106, CSO137	0.3363	16.47	0.2981	18.58
_SO_MF_097_M_10_B_B	South Fork Beargrass Creek	Treatment Facility	This project includes the construction of an 6.73 MG off-line underground storage basin for CSOs 097, 108, 109, 110, 111, 148 & 151. The facility will require an 6.73 MGD effluent PS to return the stored flow to the interceptor over a 24-hour period.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO018, CSO097, CSO106, CSO108, CSO109, CSO110, CSO111, CSO137, CSO148, CSO151	$1.55	110.42	$1.30	127.0

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~~L_SO_MF_106_S_08_A_A~~	~~South Fork Beargrass Creek~~	~~Sewer Separation~~	~~This project includes the construction of a new storm sewer system consisting of 60 LF of 12" pipe in street and 20 LF of 27" pipe in street; plus 20 LF of 12" pipe out of street, 555 LF of 24" pipe out of street, and 390 LF of 27" pipe out of street.~~	~~There's approx. __ properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.~~	~~CSO106~~		~~0.00~~		~~0.00~~
L_SO_MF_108_S_09A_B_A	South Fork Beargrass Creek	In-line Storage	NOT YET REVIEWED	NOT YET REVIEWED	CSO108	$1.67	17.13	$1.61	17.80
~~L_SO_MF_108_S_09B_B_A~~	~~South Fork Beargrass Creek~~	~~Off-Line Storage~~	~~This project includes an underground covered off-line storage basin to reduce overflows at CSO 108. Assumes 300' of gravity line to a 0.79 MG basin and includes a new PS and FM to empty the basin and return flows to the interceptor.~~	~~Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.~~	~~CSO108~~		~~25.98~~		~~28.35~~
L_SO_MF_109_M_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	NO NEED FOR MULTIPLE ALTERNATIVE - CSO 109 NO LONGER REQUIRES ABATEMENT (ONLY 3 OCCURRENCES)	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO018, CSO108, CSO109	$0.35	73.89	$0.32	80.39
L_SO_MF_111_M_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	This project includes a 2.64 MG underground covered storage basin for CSOs 97, 106, 110, 111, 137 & 148. The basin will have an effluent PS sized to empty the basin within a 24 hour period. (CSO 111 had 0 AAOV)	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO097, CSO106, CSO110, CSO111,CSO113, CSO137, CSO148,CSO151		0.00		0.00
L_SO_MF_111_M_10_B_A	South Fork Beargrass Creek	Treatment Facility	PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	CSO097, CSO106, CSO110, CSO111, CSO137, CSO148	0.3058	32.04	0.2767	35.41
L_SO_MF_113_M_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	This project includes a 6.64 MG underground covered storage basin for CSOs 97, 106, 110, 111, 137, 148, 113 and 151. The facility will require a 6.64 MGD PS to return stored flow to the interceptor over a 24 hour period. (CSO 111 had 0 AAOV)	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO097, CSO106, CSO110, CSO111, CSO113, CSO137, CSO148, CSO151	$0.31	0.00	$0.28	0.00
L_SO_MF_113_M_10_B_A	South Fork Beargrass Creek	Treatment Facility	This project is to provide a 65.1 MGD RTB High Rate Treatment Facility for CSOs 97, 106, 110, 111, 137, 148, 113 and 151. Annual volume stored is approximately 133.39 MG, operated 59 times per year.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO097, CSO106, CSO110, CSO111, CSO113, CSO137, CSO148, CSO151		0.00		0.00
L_SO_MF_117_M_09A_B_A	South Fork Beargrass Creek	In-line Storage	The RTC Program identified the installation of one control gate and 3 inflatable rubber gates in this area to achieve 3.2 MG of in-line storage for an estimated cost of $2,520,000 (2003 $s).	NOT YET REVIEWED	CSO117, CSO149, CSO179	0.2521	23.35	0.2309	25.49
L_SO_MF_117_M_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	This project includes a 8.67 MG underground covered storage basin for CSOs 117, 149, & 179. The facility will require a 8.67 MGD PS to return stored flow back to the interceptor. (CSO 179 had 0 AAOV)	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO117, CSO149, CSO179	$0.25	37.19	$0.23	40.60
L_SO_MF_117_M_09B_B_B	South Fork Beargrass Creek	Off-Line Storage	This project includes a 11.82 MG underground covered storage basin for CSOs 117, 149, 179 and 146. The facility will require a 11.82 MGD PS to pump stored flow back to the interceptor. (CSO 179 had 0 AAOV)	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO117, CSO142, CSO146, CSO149, CSO174, CSO179, CSO180, CSO182, CSO183, CSO184, CSO185, CSO186, CSO187, CSO188, CSO205		0.00		0.00
SO_MF_117_M_09B_B_C	South Fork Beargrass Creek	Off-Line Storage	This project is to provide a 9.3 MG, underground, covered, off-line storage basin to reduce overflows at CSOs 117 and 146 to no more than 4 per year. Annual volume stored is estimated to be approximately. 167.6 MG.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO117, CSO146	$0.08	0.00	$0.08	0.00

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L_SO_MF_117_M_10_B_A	South Fork Beargrass Creek	Treatment Facility	This project is to provide a 94.5 MGD RTB High Rate Treatment Facility for CSOs 117, 149, & 179. Annual volume stored is approximately 578 MG, operated 41 times per year.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO117, CSO149, CSO179		0.00		0.00
L_SO_MF_117_M_10_B_B	South Fork Beargrass Creek	Treatment Facility	This project is to provide an above-grade 37.5 MGD BF High Rate Treatment Facility and a below-grade 2 MG off-line storage basin for CSOs 117, 149, and 146. AAOV of captured CSO is ~225 MG.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO117, CSO142, CSO146, CSO149, CSO174, CSO179, CSO180, CSO182, CSO183, CSO184, CSO185, CSO186, CSO187, CSO188, CSO205	$0.25	37.19	$0.00	40.60
L_SO_MF_117_M_13_B_A	South Fork Beargrass Creek	RTC with Storage	This project includes a 5.47 MG underground covered storage basin for CSOs 117, 149, & 179 and 3.2 MG of ILS for the CSO group using inflatable and adjustable gates. The facility will require a 5.47 MGD PS to return stored flow back to the interceptor.	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO117, CSO149, CSO179	$0.30	22.90	$0.27	24.90
L_SO_MF_118_M_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	This project includes an 7.42 MG off-line covered storage basin for CSOs 83, 84, 118 & 119 to reduce overflows to no more than 4 per year. The basin will require an 7.42 MGD PS to return the stored flow to the interceptor after the event.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO083, CSO084, CSO118, CSO119	0.3869	0.00	0.3439	0.00
L_SO_MF_118_M_10_B_A	South Fork Beargrass Creek	Treatment Facility	This project is to provide a 89.2 MGD RTB High Rate Treatment Facility for CSOs 83, 84, 118 & 119. Annual volume stored is approximately 130 MG, operated 40 times per year.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO083, CSO084, CSO118, CSO119	$0.32	9.38	$0.00	10.
L_SO_MF_118_M_13_B_A	South Fork Beargrass Creek	RTC with Storage	This project includes an 6.62 MG off-line covered storage basin for CSOs 83, 84, 118 & 119 and 0.8 MG of ILS at CSO 118. The basin will require a 6.62 MGD PS to return the stored flow to the interceptor after the event.	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO083, CSO084, CSO118, CSO119		0.00		0.00
L_SO_MF_118_S_09A_B_A	South Fork Beargrass Creek	In-line Storage	The project consists of the installation of an inflatable rubber gate on the 8'0" Broadway Collector at CSO 118. The existing interception pipe will be replaced with 36" pipe and a 36" control gate. The gate will be operated by the RTC Program.	NOT YET REVIEWED	CSO118	$0.32	15.58	$0.29	16.85
L_SO_MF_118_S_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	This project includes an 5.79 MG off-line covered storage basin for CSO 118 to reduce overflows to no more than 4 per year. The basin will require an effluent pump station to return stored flow to the interceptor.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO118		10.70	$0.00	11.46
L_SO_MF_118_S_13_B_A	South Fork Beargrass Creek	RTC with Storage	This project includes an 4.99 MG off-line covered storage basin for CSO 118 and 0.8 MG of ILS at CSO 118 to reduce overflows to no more than 4 per year. The basin will require an effluent pump station to return stored flow to the interceptor.	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.	CSO118	$0.34	68.98	$0.27	86.78
L_SO_MF_120_S_08_A_A	South Fork Beargrass Creek	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 4,035 LF of 15" pipe in street, 180 LF of 18" pipe in street, 285 LF of 30" pipe in street and 245 LF of 30" pipe out of street.	There's approx. 110 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO120	$3.94	-13.80	$3.12	-17.38

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L_SO_MF_130_S_08_A_A	South Fork Beargrass Creek	Sewer Separation	Project includes construction of new storm sewer system consisting of 2,610 LF of 12" pipe in street,10 LF of 12" pipe out of street, 985 LF of 18" pipe in street, 360 LF of 30" pipe in street, 35 LF of 48" pipe in street, 440 LF of 48" pipe out of street	There's approx. 120 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO130	$0.06	8.74	$0.06	9.11
L_SO_MF_130_S_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	This project includes the construction of a 0.1 MG off-line underground covered storage basin for CSO 130. The facility will require a small pump station to return the stored flow to the interceptor following the wet weather event.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO130	$8.18	0.00	$7.55	0.00
L_SO_MF_130_S_10_B_A	South Fork Beargrass Creek	Treatment Facility	This project is to provide a 2 MGD RTB High Rate Treatment Facility for CSO 130. Annual volume stored is approximately 1 MG, operated 9 times per year.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO130	$66.86	1.50	$53.02	1.89
L_SO_MF_131_S_08_A_A	South Fork Beargrass Creek	Sewer Separation	Project includes construction of a new storm sewer system consisting of 1,980 LF of 12" pipe in street, 230 LF of 12" pipe out of St., 505 LF of 18" pipe in St., 1,585 LF of 27" pipe in St., 555 LF of 30 " pipe in St. & 515 LF of 48" pipe in St.	There's approx. 247 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO131	$0.36	117.80	$0.28	148.56
L_SO_MF_141_S_08_A_A	South Fork Beargrass Creek	Sewer Separation	This project includes the construction of a new storm sewer system consisting of 510 LF of 12" pipe in street plus 515 LF of 15" pipe in street.	There's approx. 140 properties impacted by this project. The design flow would be developed in accordance with the MSD Design Manual.	CSO141	$0.31	27.64	$0.28	30.35
L_SO_MF_151_M_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	This project includes an 6.21 MG underground covered storage basin for CSOs 97, 106, 110, 111, 137, 148, and 151. The facility will require an 6.21 MGD PS to return stored flow to the interceptor over a 24 hour period. (CSO 111 had 0 AAOV)	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO097, CSO106, CSO110, CSO111, CSO137, CSO148, CSO151	$0.30	23.29	$0.27	25.61
L_SO_MF_151_M_09B_B_B	South Fork Beargrass Creek	Off-Line Storage	This project includes the construction of an 5.23 MG off-line underground storage basin for CSOs 110, 111, 148 & 151. The facility will require a 5.23 MGD effluent PS to return the stored flow to the interceptor over a 24-hour period.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO110, CSO111, CSO148, CSO151	$0.30	21.60	$0.27	23.74
L_SO_MF_151_M_09B_B_C	South Fork Beargrass Creek	Off-Line Storage	This project includes the construction of an 5.14 MG off-line underground storage basin for CSOs 110, 111, & 151. The facility will require a 5.14 MGD effluent PS to return the stored flow to the interceptor over a 24-hour period. (CSO 111 had 0 AAOV)	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO110, CSO111, CSO151	$0.31	0.00	$0.28	0.00
~~*L_SO_MF_151_M_10_B_A*~~	~~South Fork Beargrass Creek~~	~~Treatment Facility~~	~~This project is to provide a 57.5 MGD RTB High Rate Treatment Facility for CSOs 97, 106, 110, 137, and 151. Annual volume stored is approximately 125.67 MG, operated 59 times per year.~~	~~Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.~~	~~CSO097, CSO106, CSO110, CSO111, CSO137, CSO148, CSO151~~	~~0.2181~~	~~0.00~~	~~$0.20~~	~~0.00~~
L_SO_MF_151_M_10_B_B	South Fork Beargrass Creek	Treatment Facility	This project is to provide a 47.1 MGD RTB High Rate Treatment Facility for CSOs 110, 111, 148 & 151. Annual volume stored is approximately 109.06 MG, operated 59 times per year	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO110, CSO111, CSO148, CSO151	$0.30	0.00	$0.27	0.00
_SO_MF_151_M_10_B_C	South Fork Beargrass Creek	Treatment Facility	This project is to provide a 45.1 MGD RTB High Rate Treatment Facility for CSOs 110 & 151. Annual volume stored is approximately 108 MG, operated 59 times per year.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a 4-hour storage at the head of the plant, which typically allows gravity conveyance, plus pump back of events < 4 hours. RTB are pump-in facilities.	CSO110, CSO111, CSO151		0.00	0	0.00

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L_SO_MF_152_M_10_B_A	South Fork Beargrass Creek	Treatment Facility	PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	CSO113, CSO152	$0.38	41.92	$0.35	45.68
L_SO_MF_153_M_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	This project includes a 2.25 MG underground covered storage basin for CSOs 120, 121, 141 and 153. The facility will require a 2.25 MGD pump station to return the stored flow to the interceptor over a 24 hour period.	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flowrate is evaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundings.	CSO120, CSO121, CSO141, CSO153		0.00		0.00
L_SO_MF_174_S_09A_B_A	South Fork Beargrass Creek	In-line Storage	The project consists of the installation an inflatable rubber gate on the 7' Sneads Branch sewer just downstream from CSO 174. The gate will be operated within MSD's Real Time Control (RTC) system.	NOT YET REVIEWED	CSO174	$0.00	0.00	$0.00	0.00
27th Street FPS	Ohio River	Eliminate dry weather overflow at USACE Flood PS	This project includes modification to the Flood PS to eliminate dry weather overflows during certain PS operational modes	Project requires approval of the proposed operational changes from the USACE	CSO019	To Be Determined	To Be Determined	To Be Determined	To Be Determined
34th Street FPS	Ohio River	Eliminate dry weather overflow at USACE Flood PS	This project includes modification to the Flood PS to eliminate dry weather overflows during certain PS operational modes	Project requires approval of the proposed operational changes from the USACE	CSO019	To Be Determined	To Be Determined	To Be Determined	To Be Determined
Starkey FPS	Ohio River	Evaluate occurrence of dry weather overflow at USACE Flood PS	This project includes evaluating operational procedures for possible modifications to the Flood PS to eliminate dry weather overflows during certain PS operational modes	Project requires approval of the proposed operational changes from the USACE	CSO020, CSO062	To Be Determined	To Be Determined	To Be Determined	To Be Determined
Shawnee FPS	Ohio River	Evaluate occurrence of dry weather overflow at USACE Flood PS	This project includes evaluating operational procedures for possible modifications to the Flood PS to eliminate dry weather overflows during certain PS operational modes	Project requires approval of the proposed operational changes from the USACE	CSO189	To Be Determined	To Be Determined		To Be Determined

DRAFT

Project Cost Summary Sheet

Project ID: L_OR_MF_015_M_13_B_A

Description: This project includes a 25.6 MG open concrete basin for CSOs 015 and 191 incorporating 20 MG ILS between PRFPS and SGC in SWO. The basin is located east of I-264 adjacent to MSD property. The facility is gravity in gravity out operation.

Estimate Date: 6/19/2008

Prepared By: PRS/TWK, OBG & GTB, HDR — Printed Date: 6/19/2008

Cost Estimate Description		Totals
Estimated Open Cut Sewer Construction Cost	$	710,000
Estimated Tunneling Construction Cost	$	3,882,000
Estimated Off-line Storage Facilities Construction Cost	$	15,218,000
Estimated I/I Removal Cost	$	-
Estimated Pump Station Cost	$	4,294,000
Estimated Flow Control Structure	$	2,756,000
Estimated Earthen Basin Cost	$	-
Estimated Force Main Cost	$	2,162,000
Estimated High Rate Treatment Cost	$	-
Estimated Screening Cost	$	-
Misc. Extra Cost Description: deep excavation	$	5,000,000
Total Estimated Construction Cost =	**$**	**34,022,000**

Real Estate Costs Description			Totals
Easement Cost	# of Properties =	0	$ -
Property Acquisition			$ -
Misc. Extra Cost Description:			$
Total Additional Costs =			**$ -**

Multipliers Description	Multiplier
Administration Costs	4%
Contingencies	25%
Interest	6%
Miscellaneous	9%
Engineering & Inspection	8%
Design Services	5%
Program Management	4%
Planning & Preliminary Design	2%
Performance Bond	1%
Total Multipliers =	**64%**

Data File Base ENRCCI	7312	PROJECT CAPITAL COST ESTIMATE =	$ 55,796,000
Data File ENRCCI in use	7888	Project 20 Year Present Worth Estimate =	$ 54,947,000

For Economy of Scale when dealing with the facility worksheets for a facility whose size is far greater than the largest available on the curve use the following Economy of Scale equation to adjust the cost and enter the adjustment in the Misc. Extra Cost. (Professional Engineering judgement to be used for decision to use this adjustment.)

C = Cr (Qc / Qr) ^ m

Cr = cost from tool at maximum size for facility cost curve

Qc = design size

Qr = maximum size for facility from cost curve

C = cost for design size Qc

m = correlation exponent (0 < m < 1) Use 0.6 for all structures

EXAMPLE: For a BF facility of 500 MGD where 100 is the maximum size on the curve use

C = $41,686,164 * (500 / 100) ^ 0.6	=	$	109,489,869
C500 from Tool	=	$	208,281,000
Difference (C - C500)	=	**$**	**(98,791,131)**

Enter the Difference as a negative value in the Misc. Extra Cost row and enter in Economy of Scale Adjustment in the Description.

Benefit/Cost Model Cost Data		
Capital Cost	$	64,834,844
Total Present Worth	$	59,558,424

ENRCCI overwrite by Estimator

PROJECT CAPITAL COST ESTIMATE =	$	60,478,676
Project 20 Year Present Worth Estimate =	$	59,558,424
Construction Cost Estimate =	$	36,877,295

Project Values Summary Sheet

Value Description	Totals
Length of Open Cut Sewer Conveyance (Feet)	30
Length of Tunnel Sewer Conveyance (Feet)	1,000
Off-line Storage Annual Volume Stored (Million Gallons)	158
Off-line Storage Estimated # of Annual Occurrence	9
Flow Control Structure Annual Volume Stored (Million Gallons)	250
Flow Control Structure Estimated # of Annual Occurrence	60
Earthen Basin Annual Volume Stored (Million Gallons)	0
Earthen Basin Estimated # of Annual Occurrence	0
Annual Volume of Pumping (Million Gallons)	158
Estimated Total Dynamic Head of Pumping (Feet)	45
Length of Force Main Conveyance (Feet)	14,400
Annual Volume of High Rate Treatment (Million Gallons)	0
High Rate Treatment Estimated # of Annual Occurrences	0
Screening Estimated # of Annual Occurrences	0
Screening Annual Volume Disinfected	0

MSD

CSO LTCP
Initial Solutions
Project Fact Sheet

PROJECT WIN
Waterway Improvements Now

LTCP Project Number: *L_OR_MF_015_M_13_B_A*

Project Type: RTC with Storage

Receiving Stream: Ohio River

Project Description: This project includes a 25.6 MG open concrete basin for CSOs 015 and 191, incorporating 20 MG ILS between PRFPS and SGC in SWO. The basin is located east of I-264 adjacent to MSD property. The facility is gravity in-gravity out.

Design Parameters / Assumptions: Available CSS storage capacity is based on June, 2001 RTC Study. Flow Control assumes inflatable dams are available at the time of construction. Down-sized storage basin design with Flow Control assumptions are same as Off-line Storage technology.

Surrounding Area Land Use: Project is located within 'Vacant and Undeveloped' and a small portion of 'General Comm. & Office'

Apparent Utilities Description: No major utility conflicts.

Capital Projects: 2009~FY08/09 CD-1 Drainage Improvement - Awaiting Start; 2013~ Campground Rd. @ Cabe Run Rd., RYC @ Southwestern Outfall (SWOR1)

Estimated Capital Cost (2010 dollars): $64,834,844

Capital Cost / Gallon Overflow Removed: $0.15

Weighted Benefit / Cost Ratio (Capital Cost): 7.68

Overflow Points Addressed:

CSO Number	CSO Name	2008 AAOV (MG / Yr)	Number of Overflow / Yr	CSO Area (Acres)
CSO015	Southwestern Pump Station	494.56	61	7,496.70
CSO191	Algonquin Parkway Sanitary Diversion	32.42	19	339.75

NOTE: [illegible]

OPEN CUT SEWER CONSTRUCTION VALUE ENTRY SHEET

Project ID: *L OR MF 015 M 13 B A*

Estimate Date 6/19/2008

Printed Date 6/19/2008

Prepared By: PRS/TWK, OBG & GTB, HDR

Segment ID	*Pipe Size (in)	Length of Pipe in Street (ft)	Length of Pipe out of Street (ft)	**Average Depth (ft)	# of San. Service Laterals	# of Aband'd Inlets	# of New Inlets	# of Water Services Replaced	Street Width (ft)	# of Manholes	# of Diversion Structures	# of Existing MH Surface Rehabs	Small Medium or Large Creek Crossing (S,M, or L)	Sewer in Rock	Dewatering Required	Maintenance of Flow	Brownfields	Clearing and Grubbing	Traffic Maintenance Required	Urban Alignment	Total Cost Per Segment
# 015-Basin	132	0	10	25	0	0	0	0	0	0	1	0			x						$ 152,469
015-Basin	132	0	10	25	0	0	0	0	0	0	1	0			x						$ 152,469
Basin Inl	78	0	10	25	0	0	0	0	0	0	1	0			x						$ 144,927
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -
	0	0	0	0	0	0	0	0	0	0	0	0									$
	0	0	0	0	0	0	0	0	0	0	0	0									$ -
	0	0	0	0	0	0	0	0	0	0	0	0									$
	0	0	0	0	0	0	0	0	0	0	0	0									$ -
	0	0	0	0	0	0	0	0	0	0	0	0									$
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -
	0	0	0	0	0	0	0	0	0	0	0	0									$
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -
	0	0	0	0	0	0	0	0	0	0	0	0									$

30 = Total Length of Open Cut Job

0 = Total Length of Sanitary Sewer in Rock

Total Cost for Construction = $ 449,866

Small Job Multiplier = 58%

Estimated Total Sewer Construction Cost = $ 710,009

* Use standard pipe sizes with maximum pipe size of 144 inches

** Minimum depth is 5 feet. For depths that are greater than 25 feet use Tunneling worksheet

TUNNELING VALUE ENTRY SHEET

Project ID: L OR MF 015 M 13 B A

Estimate Date 6/19/2008

Printed Date 6/19/2008

Prepared By: PRS/TWK, OBG & GTB, HDR

Segment ID	*Pipe Size (in)	Length of Pipe (ft)	Average Depth (ft)	# of Launching Shafts (Tunneling)	# of Receiving Shafts (Tunneling)	# of Access Shafts (TBM)	# of Small (Q<12 MGD) Deep Tunnel Dropshaft Complexes (TBM)	# of Large (Q>12 MGD) Deep Tunnel Dropshaft Complexes (TBM)	Auger Bore (6" - 54") **	Microtunneling (21" - 84")	TBM Tunneling (42"-384")	Rock, Mixed-face (Bore Only)	Grade > 2% (Bore only)	Mixed-face (Tunnelings)	Pit or Shaft in St. (Trfc. Maint.)	Dewatering Required	R/R or Freeway Crossing	Brownfields	Urban Alignment	Total Cost Per Segment
191 Basin	78	1,000	40	1	1	0	0	0		x						x				$ 2,934,591
	0	0	0	0	0	0	0	0												$ -
	0	0	0	0	0	0	0	0												$
	0	0	0	0	0	0	0	0												$ -
	0	0	0	0	0	0	0	0												$
	0	0	0	0	0	0	0	0												$ -
	0	0	0	0	0	0	0	0												$
	0	0	0	0	0	0	0	0												$ -
	0	0	0	0	0	0	0	0												$
	0	0	0	0	0	0	0	0												$ -
	0	0	0	0	0	0	0	0												$
	0	0	0	0	0	0	0	0												$ -
	0	0	0	0	0	0	0	0												$
	0	0	0	0	0	0	0	0												$ -
	0	0	0	0	0	0	0	0												$
	0	0	0	0	0	0	0	0												$ -
	0	0	0	0	0	0	0	0												$
	0	0	0	0	0	0	0	0												$ -
	0	0	0	0	0	0	0	0												$
	0	0	0	0	0	0	0	0												$ -
	0	0	0	0	0	0	0	0												$
	0	0	0	0	0	0	0	0												$ -
	0	0	0	0	0	0	0	0												$
	0	0	0	0	0	0	0	0												$ -
	0	0	0	0	0	0	0	0												$

1,000 = Total Length of Tunnel Job

Total Cost for Construction = $ 2,934,591

Small Job Multiplier = 32%

Estimated Total Tunneling construction Cost = $ 3,882,463

* Use standard pipe sizes

** Auger Bore maximum depth of 25 feet

OFF-LINE STORAGE FACILITY VALUE ENTRY SHEET

Project ID: *L_OR_MF_015_M_13_B_A*

Estimate Date 6/19/2008
Printed Date 6/19/2008

Prepared By: PRS/TWK, OBG & GTB, HDR

Facility ID	***Tank Volume (MG)	Annual Volume Stored (MG)	# of Times Operated per Year	Below Ground	Above Ground	Uncovered Storage	Odor Control*	Dewatering Required	Brownfields	Total Cost Per Facility**
Basin	25.6	158	9			x		x		$ 15,218,403
-	0	0	0							$ -
-	0	0	0							$ -
-	0	0	0							$ -
-	0	0	0							$ -
-	0	0	0							$ -
-	0	0	0							$ -
-	0	0	0							$ -
-	0	0	0							$ -
-	0	0	0							$ -
-	0	0	0							$ -
-	0	0	0							$ -
-	0	0	0							$ -
-	0	0	0							$ -
-	0	0	0							$ -

Estimated Total Facility Construction Cost = $ 15,218,403

List documentation for decision to use above or below ground storage facility

* - Odor control is not necessary with flushing used unless in a residential area
** - Pumping is not included in storage facility cost curves. Use the pump station cost estimating sheet for the additional costs
*** - Limit to Cost curve for storage tanks are 50 MG. If over 50 MG use multiple tanks

FLOW CONTROL STRUCTURE VALUE ENTRY SHEET

Project ID: *L_OR_MF_015_M_13_B_A*

Estimate Date: 6/19/2008
Printed Date: 6/19/2008

Prepared By: PRS/TWK, OBG & GTB, HDR

	TYPE (CHOOSE ONE)												
Facility ID	**Inflatable Dam**	**Adjustable Gate**	**Equivelant Pipe Diameter (inches)**	**Depth to Invert (ft)**	**Storage Volume in Pipe (MG)**	**Annual Volume Stored (MG)**	**# of Times Operated per Year**	**Include SCADA Equip.**	**Pump Back Station Req'd**	***Odor Control**	**Dewatering Required**	**Structure in Floodplain**	**Total Cost Per Facility**
ILS	x		16	45	19.8	250	60	x					$ 2,642,998
ILS		x	108	45	0	0	0						$ 112,624
C			0	0	0	0	0						$ -
D			0	0	0	0	0						$ -
E			0	0	0	0	0						$ -

Estimated Total Facility Construction Cost = $ 2,755,622

* - Odor control is not necessary unless in a residential area with long storage periods anticipated.

PUMP STATIONS VALUE ENTRY SHEET

Project ID: *L_OR_MF_015_M_13_B_A*

Estimate Date: 6/19/2008

Printed Date: 6/19/2008

Prepared By: PRS/TWK, OBG & GTB, HDR

Facility ID	**Estimated Depth (ft)	Estimated Total Head (ft)	*Estimated Peak Flow Rate (MGD)	***In Rock	Odor Control	Grinders Required	Add Grit Pit	Dewatering Required	Brownfields	Exclude Structure (-%)	Total Cost Per Facility
Basin	0	0	0							0%	$ -
ILS	45	45	20							0%	$ 4,294,307
C	0	0	0							0%	$ -
D	0	0	0							0%	$ -
E	0	0	0							0%	$ -

Enter Description if Exclude Structure -% used:

Estimated Total Pump Station Construction Cost = $ 4,294,307

* - Pump station cost curve limits out at 200 MGD. If over 200 MGD use multiple pump stations and do not check box any extras or reenter the same depth
** - Cost per linear foot increases at depths of 20, 50, 100 and 150 feet
*** - Being in rock is beneficial at depths greater than 50 feet. In Rock should not be checked at these depths.

FORCE MAIN CONSTRUCTION VALUE ENTRY SHEET

Project ID: L_OR_MF_015_M_13_B_A

Estimate Date 6/19/2008

Printed Date 6/19/2008

Prepared By: PRS/TWK, OBG & GTB, HDR

Segment ID	*Pipe Size (in)	Length of Pipe in Street (ft)	Length of Pipe out of Street (ft)	Average Depth (ft)	# of Utility crossings	Street Width (ft)	# of Manholes	# of Air Release Valves	Small Medium or Large Creek Crossing (S,M, or L)	In Rock	Dewatering Required	Brownfields	Clearing and Grubbing	Traffic Maintenance Required		Total Cost Per Segment
ILS	18	0	7,200	10	0	0	0	5					x			$ 1,081,006
ILS	18	0	7,200	10	0	0	0	5					x			$ 1,081,006
C	0	0	0	0	0	0	0	0								$ -
D	0	0	0	0	0	0	0	0								$ -
E	0	0	0	0	0	0	0	0								$ -
F	0	0	0	0	0	0	0	0								$ -
G	0	0	0	0	0	0	0	0								$ -
H	0	0	0	0	0	0	0	0								$ -
I	0	0	0	0	0	0	0	0								$ -
J	0	0	0	0	0	0	0	0								$ -
K	0	0	0	0	0	0	0	0								$ -
L	0	0	0	0	0	0	0	0								$ -
M	0	0	0	0	0	0	0	0								$ -
N	0	0	0	0	0	0	0	0								$ -
O	0	0	0	0	0	0	0	0								$ -
P	0	0	0	0	0	0	0	0								$ -
Q	0	0	0	0	0	0	0	0								$ -
R	0	0	0	0	0	0	0	0								$ -
S	0	0	0	0	0	0	0	0								$ -
T	0	0	0	0	0	0	0	0								$ -
U	0	0	0	0	0	0	0	0								$ -
V	0	0	0	0	0	0	0	0								$ -
W	0	0	0	0	0	0	0	0								$ -
X	0	0	0	0	0	0	0	0								$ -
Y	0	0	0	0	0	0	0	0								$ -

*Note - pipe sizes range from 6" to 54". If a larger forcemain may be required it is recommended that the estimator cost out dual forcemains of smaller diameter

14,400 = **Total Length of Force Main**

Estimated Total Force Main Construction Cost = $ 2,162,012

Cluster Comparison

L OR MF 015 M 13 B A

CSO/SSO ID		Raw Benefit Score[2] Regulatory Performance	Public Health	Asset Protection	Environmental Enhance	Eco-Friendly Solutions
015		13	13	0	9	-8
191		12	12	0	9	-8
				0	0	0
				0	0	0
				0	0	0
Weighting Factor		8	10	6	8	6
Weighted Benefit Score		200	250	0	144	-96
Total Benefit Score	498					
Total Capital Cost[3]	$64,834,844					
Total Present Worth Costs[3]	$59,558,424					
Weighted Benefit/Cost Ratio (Capital Costs)	7.6811					
Weighted Benefit/Cost Ratio (Total Present Worth Costs)	8.3615					

Notes:
1. Data Input Cells are highlighted in yellow
2. Raw Benefit Scores for Regulatory Performance and Public Health values are from the CSO or SSO Level of Control Benefit Sheets
3. Capital and Total Present Worth Costs from the "Proj Summary" Page of the Cost Model for the clustered alternative

MSD CSO
Long Term Control Plan
L_OR_MF_015_M_13_B_A

DRAFT

N

Legend

- Active CSO Location
- Eliminated CSO Location
- Existing Sewer Line
- Abandoned Sewer Line
- Interstate
- Railroad
- Parcel Boundary
- Cemetery
- Metro Park
- Water Feature

NOTE: The CSO Boundaries are uniquely symbolized within the map.

Aerial Date: 2006
Graphic Date: Jun 19, 2008

1 inch equals 400 feet

LOJIC MSD

This document was developed in color. Reproduction in Black and White may not represent the data as intended.

L OR MF 015 M 09B B A	L OR MF 015 M 13 B A												
Value:	**Asset Protection**												
	Measure		**Impact**							**Rationale**	**Measurement Method**		
Performance Measures		Flood Damage	Homes or businesses are subject to severe structural damage	Homes or businesses are subject to minor to moderate structural damage	Flooding limits access to homes or businesses	Flooding limits access to recreational areas	Standing water on property, but access not affected and no damage expected	No standing water		Stormwater BMPs can reduce stormwater peaks and reduce extent of flooded areas while sewer separation may increase localized stormwater peak flows and increase the flooding impacts of storms. Alternatively, purchase of highly impacted properties may be a cheaper way to reduce flood damage and create green space and buffer zones	Drainage models where available, historic customer complaints from MSD Customer Information System, or historic observations of flood-prone areas combined with the expected relative impacts of sewer system modifications on storm water flows		
		Basement Back-ups	Sewer surcharging within 6 feet of ground surface for more than 20% of manholes	Sewer surcharging within 6 feet of ground surface for 10 - 20% of manholes	Sewer surcharging within 6 feet of ground surface for 5 - 10% of manholes	Sewer surcharging within 6 feet of ground surface for 1 - 5% of manholes	Sewer surcharging within 6 feet of ground surface for 0 - 1% of manholes	No surcharging within 6 feet of ground surface		First floor levels are typically 1 - 2 feet above ground surface, and basement floors are typically 8 - 10 feet below the first floor. A sewer surcharge of 6 feet below ground surface is highly likely to cause back-ups in homes with basement service.	Measurement methods will be via hydraulic models to quantify the hydraulic grade lines compared to ground surface elevations at manholes		
	Storm Events	→	Most Severe Impact				Least Impact	No Impact					
		▼	5	4	3	2	1	0		**Assumptions**	**Base Case Score**	**Alternative Score**	**Total Score**
Frequency	6 Month	Most Likely	5	25	20	15	10	5	0	8.95% of manholes surcharged	15	15	0
	1 Year		4	20	16	12	8	4	0	9.95% of manholes surcharged	12	12	0
	2 Year		3	15	12	9	6	3	0	14.55% of manholes surcharged	12	12	0
	5 Year		2	10	8	6	4	2	0	27.02% of manholes surcharged	10	10	0
	10 Year	Least Likely	1	5	4	3	2	1	0	56.05% of manholes surcharged	5	5	0
	Not Possible	Not Possible	0	0	0	0	0	0	0		Total Score		0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.													
Acronyms BMPs - Best management practices													

L OR MF 015 M 09B B A	L OR MF 015 M 13 B A												
Value:	Environmental Enhancement												
	Scoring												
Aspect:	-5	-4	-3	-2	-1	0	1	2	3	4	5	Assumptions	Score Per Aspect
Aquatic and Terrestrial Habitat Protection	Elimination of habitat or risk to endangered species	Elimination of significant amount of common habitat	Elimination of small amount of common habitat	Significant habitat impairment	Minor impairment to existing habitat	No impact on habitat	Minor enhancement of existing habitat	Significant enhancement of existing habitat	Creation of minor amount of common habitat	Creation of significant amount of common habitat	Creation of critical habitat for rare or endangered species		
Aesthetics : Solids and Floatables	<5% reduction in volume of flow with no S&F capture	50 - 75% of flow with no S&F removal	25 - 50% of flow with no S&F removal	10 - 25% of flow with no S&F removal	Reduced efficiency of existing S&F system (design < 10% of flow with no S&F removal	No change in S&F removal	0 - 10% of discharged flow treated with positive S&F removal (screens)	10 - 25 % of discharged flow treated with positive S&F removal (screens)	25 - 50% of discharged flow treated with positive S&F removal (screens)	50 - 75% of discharged flow treated with positive S&F removal (screens)	75% + of discharged flow treated with positive S&F removal (screens)		
Aesthetics : Odor and Air Emissions	Create annoying odor source affecting > 20 customers often	Create annoying odor source affecting > 20 customers occasionally	Create annoying odor source affecting > 20 customers occasionally	Create detectable odor source affecting > 50 customers often	Create detectable odor source affecting > 50 customers occasionally	No impact on odors	Eliminate detectable odor source affecting > 20 customers occasionally	Eliminate detectable odor source affecting > 50 customers often	Eliminate annoying odor source affecting > 20 customers occasionally	Eliminate annoying odor source affecting > 20 customers occasionally	Eliminate annoying odor source affecting > 20 customers often		
Dissolved Oxygen Impacts	Reduction in instream DO by 2 mg/l + during critical flow periods	Continuous reduction in instream DO of 2 mg/l	Continuous reduction of in-stream DO of 0 - 2 mg/l; possible reduction of in-stream DO of 1 - 4 mg/l during critical conditions	Intermittent reduction of in-stream DO 2 mg/l + (less frequent during non-critical conditions); reduction in DO of 1 - 2 mg/l during critical conditions	Intermittent reduction of in-stream DO of 1 - 2 mg/l (possible during non-critical conditions	No DO impacts	Intermittent improvement of instream DO of 1 - 2 mg/l	Intermittent improvement of in-stream DO 2 mg/l + (less frequent during non-critical conditions); improvements of 1 - 2 mg/l	Continuous improvement of in-stream DO of 1 - 2 mg/l; intermittent critical condition improvements 3-4 mg/l	Continuous improvement of in-stream DO 2 mg/l +	Continuous improvement of critical conditions in-stream DO of 1 - 2 mg/l		
Downstream Impacts	>5% increase in annual BOD or nutrient loads	50 - 75% increase in annual BOD or nutrient loads	25 - 50% increase in annual BOD or nutrient loads	10 - 25% increase in annual BOD or nutrient loads (CSO + runoff)	Potential 0 - 10 % increase in annual average BOD or nutrient loads (CSO + runoff)	No impact on BOD or nutrient loads (CSO + runoff)	0 - 10% reduction in annual BOD or nutrient loads (CSO + runoff)	10 - 25% reduction in annual BOD or nutrient loads (CSO + runoff)	25 - 50% reduction in annual BOD or nutrient loads (CSO + runoff)	50 - 75% reduction in annual BOD or nutrient loads (CSO + runoff)	75%+ reduction in annual BOD or nutrient loads (CSO + runoff)		
Stream Flow Impacts (Peak flows)	25% + increase in peak flows	10% - 25% increase in peak flows	Up to 10% increase in peak flows	Frequent increase in flow during critical conditions	Possible increase in average flow or minor increase in high flow years	No impact on peak flows	Minor reduction in flows, no significant peak reduction	Minor reduction in peak flows under some conditions	Up to 10% reduction in peak flows	10% - 25% reduction in peak flows	25%+ reduction in peak flows		
Stream Flow Impacts (DWF only)	25%+ decrease in flow during critical conditions	10% - 25% decrease in flow during critical conditions	0 -10% permanent decrease in flow during critical conditions	Frequent decrease in flow during critical conditions	Possible decrease in average flow	No impact on average or base stream flow	Intermittent increase in stream flow, not limited to critical conditions	Intermittent increase in stream flow, often improves critical conditions	0 - 10% permanent increase in stream flow during critical conditions	10 - 25 % permanent increase in stream flow during critical conditions	25%+ permanent increase in stream flow during critical conditions		

Instructions: (1.) Score each alternative for each of the seven aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "fatal flaw". Alternatives that score in this area should not be proposed.

Total Raw Score Calculated

Total Score Default

Aspect	Rationale	Measurement Method
Aquatic and Terrestrial Habitat Protection	Wet weather projects may affect both aquatic and terrestrial habitat through changes in base flow, peak flow, water quality, tree cover, channel shape and characteristics etc. Predictive models used to evaluate wet weather control measures have a limited ability to predict biological diversity changes, erosion impacts etc., so surrogate metrics must be used to estimate future positive and negative impacts.	Project definition may specifically address changes in channel shape and configuration, tree cover etc. Predictive models will address DO and other water quality impacts. Flow models will predict base flow and peak flow rates to allow estimates of changes in erosion and water surface area.
Aesthetics : Solids and Floatables	Most CSOs have some form of solids and floatables control (baffles). Improvements in capture rates can be expected with screening or other advanced treatment options. Storm water retention (constructed wetlands), and other control systems may provide solids and floatables removal as well. While reduction in solids and floatables removal efficiency is not likely, penalty points will be assessed if this is possible with any alternative.	Current solids and floatables removal efficiency has been estimated for all sites with control technology. Improvements in removal efficiencies will be estimated for all alternatives that add screening or other advanced treatment technologies. Where treatment is proposed for storm water discharges removals will be estimated based on published removal data.
Aesthetics : Odor and Air Emissions	Odors and air emissions can be generated in storage systems, pump stations, force mains, and long flat sewers. Odors are generally characterized by both the intensity and the quality of the odor. Detectable and annoying are two common descriptors of different intensities and qualities of odors from sewage handling facilities.	Odor emissions from sewage handling facilities can be modeled for intensity, quality, and geographic spread. For planning purposes this level of evaluation is not common, and will not be done except in very rare circumstances. The potential for odor and air emissions will be estimated based on typical applications and model predictions for storage time, number of events, average flow velocities etc.
Dissolved Oxygen Impacts	Dissolved oxygen in streams is dependent on a variety of factors including BOD load, nutrient load, stream flow velocity, water temperature, etc.	For BGC the Water Quality Tool will be used to estimate the impacts of various loading conditions, flows, temperatures, etc. Probable impacts of individual projects will be estimated based on comparisons to the various stream condition scenarios.
Downstream Impacts	Downstream impacts refer to conditions in the Ohio River below Jefferson County. Nutrient loadings in the Ohio (not just Jefferson County) have been identified as the source of 30 - 45% of the total nutrient loads reaching the Gulf of Mexico. BOD is not likely to persist in the river long enough to get to the Gulf, but can have detrimental impacts far downriver.	Pollutant removals will be estimated based on reductions in annual average loads, since the downstream impacts are primarily long-term and cumulative.
Stream Flow Impacts (Peak flows)	Extremely high peak flows as are often caused by urbanization of a watershed can erode the streambed, damage aquatic and terrestrial habitat, make water based recreation unsafe or impractical.	Predictive models can estimate flow peaking factors from individual sources, and the Water Quality Tool has a hydraulic component to estimate stream flows during various storm events.
Stream Flow Impacts (DWF only)	Diversion of flows away from a stream due to abandonment of a treatment plant etc. can reduce base flows in a stream. Alternatively, other control measures such as groundwater pumping can increase base flows with beneficial results.	Predictive models can estimate flows from individual sources, and the Water Quality Tool has a hydraulic component to estimate stream flows during various dry weather events.

Note: The total score calculated may be more than 25. In the instances where this might occur, a default maximum score of 25 will be calculated.

Acronyms
BGC - Beargrass Creek
BOD - Biological oxygen demand
CSO - Combined sewer overflow
DO - Dissolved oxygen
DWF - Dry weather flow
mg/l - Milligram per liter
S&F - Solids and floatables

L OR MF 015 M 09B B A	L OR MF 015 M 13 B A												
Value:	**Eco-Friendly Solutions**												
	Scoring												
Aspect	-5	-4	-3	-2	-1	0	1	2	3	4	5	Assumptions	Score Per Aspect
Non-Renewable Energy Consumption	Primary energy consumption is greater than secondary treatment	Primary energy consumption equal to 75 - 100% of secondary treatment	Primary energy consumption equal to 50 - 75% of secondary treatment	Primary energy consumption equal to 15 - 30% of secondary treatment	Primary energy consumption equal to 0 - 15% of secondary treatment	No energy consumption except for cleaning and maintenance	Cleaning and maintenance not needed, no primary consumption	NA	NA	NA	NA	[illegible]	-
Use of Natural Systems	Constructed facilities permanently displace 5+ acres wetlands or 50% locally available green space	Constructed facilities permanently displace 3 - 5 acres wetlands or 25 - 50% locally available green space	Constructed facilities permanently displace 1 - 3 acres wetlands or 10 - 15% locally available green space	Constructed facilities permanently displace 1 acre wetlands or up to 10% locally available green space	Constructed facilities temporarily disrupt wetlands or green space	Alternative does not use or affect natural systems, wetlands, or green space	Alternative doesn't not use natural systems, but enhances green space or wetland	Natural systems play a minor role in alternative function, up to 1 acre wetland or 10% additional green space created	Natural systems are a significant part of alternative function, 1 - 3 acres of wetland created or 10 - 25% additional green space	Alternative fully uses natural systems, 3 - 5 acres of wetland created or 25-50% additional green space	Alternative results in multi use natural system development, 5+ acres of wetland or 50% additional green space	[illegible]	-
Multiple-Use Facilties	Constructed facilities permanently eliminate recreational opportunity	Constructed facilities significantly impare recreational opportunity	Constructed facilities moderately impare recreational opportunity	Constructed facilities have minor impacts on recreational opportunity	Construction temporarily impacts recreational opportunity	No impacts on recreational opportunities	Alternative improves access to existing recreational areas	Alternative has limited positive impact on recreation	Alternative significantly enhances recreational opportunities	Alternative increases recreational opportunities in area	Alternative results in multi use facility	[illegible]	-
Source Control of subwatershed pollutant loads	Pollutant loadings are increased by 50%	Pollutant loadings are increased by 30 - 50%	Pollutant loadings are increased by 10 - 30%	End of pipe pollutant loadings are increased by 0 - 10%	End of pipe pollutant loadings impacts are inconsistent, but likely higher	End of pipe pollutant loadings are unchanged	Pollutant loadings impacts are inconsistent, but likely lower	Source control reduces pollutant loadings by 0 - 10%	Source control reduces pollutant loadings by 10 - 30%	Source control reduces pollutant loadings by 30 - 50%	Source control reduces pollutant loadings by more than 50%	[illegible]	-
Non-Obtrusive Construction Techniques	Permanent loss of green space or sensitive area disruption	Main thoroughfare closures, sensitive area temporary disruptions	Widespread dust and noise, blasting, secondary street closures	Localized dust, noise and local street closures	Minor dust and noise, traffic lane closures	No construction impacts	NA	NA	NA	NA	NA	[illegible]	-3
Consistent Land Use	Intrusive or nuisance facilities inconsistent with neighborhood or land use	Facilities inconsistent with neighborhood or land use	Facility characteristics mitigated to reduce impact on neighborhood	Facilities have significant impact on development density or land use	Facility has minor impact on development density or land use	No impact on land use or no above ground facilities	Alternative mitigates existing compatibility problem	Alternative removes facility inconsistent with neighborhood	Alternative removes nuisance facility from neighborhood	Alternative enhances property values in neighborhood	Alternative provides enhancements that significantly improve neighborhood	[illegible]	-
Impermeable Surfaces	5 acres+ of impermeable surfaces are added	3 - 5 acres of impermeable surfaces are added	1 - 3 acres of impermeable surfaces are added	up to 1 acre of impermeable surfaces are added	Minor increase in impermeable surfaces added	No change in impermeable surfaces	Minor reduction in impermeable surfaces	up to 1 acre of impermeable surfaces removed	1 - 3 acres of impermeable surfaces removed	3 - 5 acres of impermeable surfaces removed	More than 5 acres of impermeable surfaces removed	[illegible]	-2
LEEDS Performance	NA	NA	NA	NA	NA	LEEDS not applicable or LEEDS score <10	LEEDS Score 10 - 25	LEEDS Certified	LEEDS Silver	LEEDS Gold	LEEDS Platinum	[illegible]	-

Instructions: (1.) Score each alternative for each of the eight aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "fatal flaw". Alternatives that score in this area should not be proposed.		Total Raw Score Calculated	-6
		Corrected Score	-6

Aspect	Rationale	Measurement Method
Non-Renewable Energy Consumption	Eco-friendly solutions would be expected to be low consumers of non-renewable energy. Benchmarking energy consumption against conventional secondary treatment provides penalty points for high energy consuming alternatives.	Evaluation of primary energy consumed per MG of flow treated, compared to the energy consumed at the WCWTP per MG treated.
Use of Natural Systems	Natural systems replace concrete and steel construction with wet bottom storage lagoons, constructed bioswales, bird gardens etc. that increase green space of various kinds. Options that reduce wetlands and green space get penalty points.	Acres of wetlands and other types of green space created or eliminated. Also includes subjective evaluation of the "basis of the alternative", "green" or "grey".
Multiple-Use Facilties	Eco-friendly solutions create recreational opportunities for both water-based and riparian recreation. Boating, canoeing, kayaking, fishing, wading, swimming etc. would be direct water based recreation. Bird watching, hiking, biking, picnicing, camping etc. would be considered related riparian recreation.	Subjective evaluation of changes predicted in the aquatic or riparian environment as a result of better water quality, increased base flow or decreased flow peaks, increased tree cover or vegtated riparian areas etc.
Source Control of subwatershed pollutant loads	Controlling pollutant loads at the source through behavior modification, product replacements or stormwater management BMPs that capture pollutants thereby avoiding end of pipe treatment requirements.	Modeled land side pollutant loading reductions as calculated by the BGC Water Quality Tool or by comparision to literature values or pilot program measurements.
Non-Obtrusive Construction Techniques	Probable construction impacts on traffic, noise and dust are all measures of the friendliness of an alternative. Construction impacts get penalty points for creating nuisance conditions.	Subjective evaluation of probable construction impacts based on the type of construction envisioned for the alternative.
Consistent Land Use	Alternative configuration can either enhance or detract from the surrounding property. For example, an extremely unfriendly pump station can be noisy, smelly, and ugly. The same pump station can be disguised as a residence that fits right in with the neighborhood. If a larger parcel of land is available, a pump station can be hidden from view by landscaping, and a community garden or other green space added to enhance the neighborhood.	At the planning level, projects can be defined to avoid negative impacts on the surrounding properties. Depending on the availability of land, enhancements are possible. This aspect encourages project definition and budgets to enhance, not detract.
Impermeable Surfaces	Adding impermeable surfaces increases total runoff volume, peak runoff flowrates, and the total transport of any pollutant deposited on the surface from any source. Conversely, permeable surfaces can reduce flow volume and peaks, and provide filtering mechanisms for pollutants.	Acres of permeable surfaces created or eliminated.
LEEDS Performance	LEED standards are applicable to alternatives that include above ground building structures.	Application of LEED evaluation points.

Note: The total score calculated may be more than 25. In the instances where this might occur, a default maximum score of 25 will be calculated.

Acronyms
BGC - Beargrass Creek
LEEDS - Leadership in Energy and Environmental Design
MG - million gallons
WCWTP - West County Wastewater Treatment Plant

CSO 015 04

Value: Public Health

Performance Measure	Measure		Impact						Rationale	Measurement Method
	Beargrass Creek CSOs	Untreated CSO Average Annual Overflow Volume (AAOV)	75 MG+ AAOV	45 - 74MG AAOV	20 - 44 MG AAOV	5 - 19 MG AAOV	>0 - 4.9 MG AAOV	No discharge	Public health impact of discharges vary based on the total volume of the discharge, the dilution downstream from the discharge, and the ability of the public to come in contact with the receiving stream downstream of the discharge. The impact score will be established through a 3 step process: (1) Establish the discharge volume using the appropriate scale for either Beargrass Creek or the Ohio River. (2) Determine if the discharge is being relocated downstream to a point of higher dilution. If so, move one column to the right for each 20% addition to the dilution. (3) If the discharge is being relocated determine the reduction in potential exposure using stream reach and accessibility ratings from the Red Wing report. Move score one column further to the right if the relocation reduces potential impact in the reach by 5 - 20%, 2 columns for 30 - 40%, 3 columns for 40 - 60 %, 4 columns for 60 - 80, and all 5 columns for more than 80%	Measurement methods will use the hydraulic models to quantify the CSO discharge. Dilution will be calculated using the average flow at the closest downstream USGS gauging station. The reduction in potential public contact will be calculated based on stream reach measurements and accessibility ratings from the "Beagrass Creek Ecological Reach Characterization Report" dated December 21, 2007 by Redwing Ecological Services. The report includes a Characterization Parameters Rating Worksheet for each stream reach with LWD ratings for accessibility and also gives the stream reach length.
	CSOs in Ohio River	Untreated CSO Average Annual Overflow Volume (AAOV)	200 MG+ AAOV	75 - 199 MG AAOV	30 - 74 MG AAOV	5 - 29 MG AAOV	>0 - 4.9 MG AAOV	No discharge		

Frequency per location			Most Severe Impact				Least Impact	No Impact	Assumptions	Base Case Score	Alternative Score	Total Score
			5	4	3	2	1	0				
Frequency	>10 per year	Most Likely	5	25	20	15	10	5	Base Case Score: Ohio River AAOV = 494.6 MG, 61 events per year	25		25
	5-10 per year		4	20	16	12	8	4				0
	1-4 per year		3	15	12	9	6	3	Alternative Score: Ohio River AAOV = 82.76 MG, 4 events per year	12		12
	2-4 year recurrence interval		2	10	8	6	4	2				0
	>4 year recurrence interval	Least Likely	1	5	4	3	2	1				0
	Not possible	Not Possible	0	0	0	0	0	0	Total Score			13

Note - This value sheet calculates the total benefit

Acronyms

AAOV - Average annual CSO - Combined sewer MG - Million gallons

FC - Fecal coliforms ml - Milliliters SSO - Sanitary sewer overflow

WQS - Water quality standards WWTPs - Wastewater treatment plants

CSO_015_04

Value: Regulatory Performance

Performance Measure	Measure		Impact						Rationale	Measurement Method
	Beargrass Creek CSOs	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 one 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.
	CSOs in Ohio River	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		

Frequency per location			Most Severe Impact				Least Impact	No Impact	Assumptions	Base Case Score	Alternative Score	Total Score
			5	4	3	2	1	0				
>10 per year	Most Likely	5	25	20	15	10	5	0	Base Case Score - Ohio River AAOV = 494.6 MG, 6* events per year	25		25
5-10 per year		4	20	16	12	8	4	0				0
1-4 per year		3	15	12	9	6	3	0	Alternative Score - Ohio River AAOV = 82.76 MG, 4 events per year	12	-12	
2-4 year recurrence interval		2	10	8	6	4	2	0				0
>4 year recurrence interval	Least Likely	1	5	4	3	2	1	0				0
Not possible	Not Possible	0	0	0	0	0	0	0	Total Score			13

Note - This value sheet calculates the total benefit

Acronyms

AAOV - Average ann FC - Fecal coliforms - MG - Millions

CSO - Combined se MG - Million gallons SSO - Sanitary sewer overflow WQS - Water quality standards

WWTPs - Wastewater treatment plants

CSO 191 04

Value: Public Health

Performance Measure	Measure		Impact						Rationale	Measurement Method
	Beargrass Creek CSOs	Untreated CSO or runoff discharge flow rate % of receiving stream flow	75 MG+ AAOV	45 - 74MG AAOV	20 - 44 MG AAOV	5 - 19 MG AAOV	>0 - 4.9 MG AAOV	No discharge	Public health impact at discharges was based on the total volume of the discharge, the dilution downstream from the discharge, and the ability of the public to come in contact with the receiving stream downstream of the discharge. The impact score will be established through a 3 step process. 1) Establish the discharge volume, using the appropriate scale for either Beargrass Creek or the Ohio River. 2) Determine if the discharge is being relocated downstream to a point of higher dilution. If so, move one column to the right for each 20% addition to the dilution. 3) If the discharge is being relocated determine the reduction in potential exposure using stream reach and accessibility ratings from the Red Wing report. Move score one column further to the right if the relocation reduces potential impact in the reach by 5 - 20%, 3 columns for 20 - 40%, 3 columns for 40 - 60 %, 4 columns for 60 - 80, and all 5 columns for more than 80%.	Measurement methods will use the hydraulic models to quantify the CSO discharge. Dilution will be calculated using the average flow at the closest downstream USGS gauging station. The reduction in potential public contact will be calculated based on stream reach measurements and accessibility ratings from the "Beargrass Creek Ecological Reach Characterization Report" dated December 21, 2007 by Redwing Ecological Services. The report includes a Characterization Parameters Rating Worksheet for each stream reach with 1-10 ratings for accessibility, and also gives the stream reach length.
	CSOs in Ohio River	Untreated CSO Average Annual Overflow Volume (AAOV)	200 MG+ AAOV	75 - 199 MG AAOV	30 - 74 MG AAOV	5 - 29 MG AAOV	>0 - 4.9 MG AAOV	No discharge		

Frequency per location			Most Severe Impact				Least Impact	No Impact	Assumptions	Base Case Score	Alternative Score	Total Score
			5	4	3	2	1	0				
Frequency	>10 per year	Most Likely	5	25	20	15	10	5	Base Case Score - Ohio River - AAOV = 32.4 MG, 19 events per year	15		15
	5-10 per year		4	20	16	12	8	4				0
	1-4 per year		3	15	12	9	6	3	Alternative Score - Ohio River - AAOV = 1.92 MG, 4 events per year	3		3
	2-4 year recurrence interval		2	10	8	6	4	2				0
	>4 year recurrence interval	Least Likely	1	5	4	3	2	1				0
	Not possible	Not Possible	0	0	0	0	0	0	Total Score			12

Note - This value sheet calculates the total benefit

Acronyms

AAOV - Average annual CSO - Combined sewer MG - Million gallons

FC - Fecal coliforms MG - Millions SSO - Sanitary sewer overflow

WQS - Water quality standards WWTPs - Wastewater treatment plants

CSO_191_04

Value: Regulatory Performance

Performance Measure	Measure		Impact						Rationale	Measurement Method
	Beargrass Creek CSOs	Untreated CSO or runoff discharge flow rate % of receiving stream flow	75 MG+ AAOV	45 - 74MG AAOV	20 - 44 MG AAOV	5 - 19 MG AAOV	>0 - 4.9 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 one 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
	CSOs in Ohio River	Untreated CSO Average Annual Overflow Volume (AAOV)	200 MG+ AAOV	75 - 199 MG AAOV	30 - 74 MG AAOV	5 - 29 MG AAOV	>0 - 4.9 MG AAOV	No discharge		

Frequency			Most Severe Impact				Least Impact	No Impact	Assumptions	Base Case Score	Alternative Score	Total Score
Frequency per location			5	4	3	2	1	0				
>10 per year	Most Likely	5	25	20	15	10	5	0	Base Case Score: Ohio River AAOV = 32.4 MG, 19 events per year	15		15
5-10 per year		4	20	16	12	8	4	0				0
1-4 per year		3	15	12	9	6	3	0	Alternative Score: Ohio River AAOV = 1.92 MG, 4 events per year	0		3
2-4 year recurrence interval		2	10	8	6	4	2	0				0
>4 year recurrence interval	Least Likely	1	5	4	3	2	1	0				0
Not possible	Not Possible	0	0	0	0	0	0	0	Total Score			12

Note - This value sheet calculates the total benefit

Acronyms

AAOV - Average annual CO - Fecal coliforms MG - Millions

SSO - Combined sewer MG - Million gallons SSO - Sanitary sewer overflow WQS - Water quality standards

WWTPs - Wastewater treatment plants

DRAFT Middle Fork Network Branch 6 / Floyds Fork Network Branch 1 - SSO Characteristics

SSO ID	SSO NAME	FACILITY TYPE	OVERFLOW CATEGORY	OVERFLOW TYPE	DISCHARGE TO	RECEIVING STREAM	SERVICE AREA	WATERSHED	MODEL REGION	AVG ANNUAL OVERFLOW VOLUME (MG/Y)	NUMBER OF OVERFLOW INCIDENTS (NO PER YR)	AVG VOLUME PER INCIDENT (GALLONS)	AVG DURATION OF OVERFLOW (HOURS)	MINIMUM RAINFALL AMOUNT (IN)
00746	Anchor Estates #1	Pump Station	Documented	Pumped	Ditch	Middle Fork	Morris Forman	Middle Fork	Middle Fork	220,732	27.6	8,000		0.18
01106	Foxboro Dr / End of St	Pump Station	Documented	Bypass	Catch Basin	Middle Fork	Morris Forman	Middle Fork	Middle Fork		1.7	No Data		2.30
MSD0057-LS	Anchor Estates #2	Pump Station	Documented	Capacity	Stream	Middle Fork	Morris Forman	Middle Fork	Middle Fork	279,334	31.0	9,000		0.09
65531	12400 Brierly Hill Rd	Manhole	Validated Modeled Overflow Point	Capacity	Ditch	Pope Lick	Floyds Fork	Floyds Fork	Floyds Fork	8,000	0.5	16,000		1.82

DRAFT Modeled 2-yr Solutions Summary

MSD
Louisville / Jefferson County Metropolitan Sewer District

PROJECT WIN

CURRENT PREFERRED SOLUTION

Watershed/Geo-graphic Region	Main SSO or Branch ID	Project or Cost Sheet Name	Documented and Suspected SSOs Addressed	Solution Technology	Project Description	Weighted Benefit/ Cost Ratio (Capital Costs)	Weighted Benefit/Cost Ratio (Total Present Worth Costs)
Cedar Creek	70158	S_CC_CC_70158_M_09A_C	70158, 28998, 28984, 63094, 63095	Storage	In-line storage with 96" pipe to store wet weather peak flow	7.67	9.77
Cedar Creek	70158	S_CC_CC_70158_S_01_C	70158, 28998, 28984, 63094, 63095	Conveyance	Upsize interceptor pipes in the area	5.51	6.94
Cedar Creek	81316	S_FF_CC_81316_M_09A_C	81316, 97362	Storage	Upsize influent lines with 48" pipe to create upstream in-line Storage	16.33	20.80
Cedar Creek	81316	S_FF_CC_81316_M_03_C	81316, 97362	Conveyance	PS upgrades	2.85	2.61
Cedar Creek	67997	S_CC_CC_67997_M_01_C	89178, 67997, 67999, 86423, 89195, 89197	Conveyance	Upsize interceptor pipe in the area	4.44	5.56
Floyds Fork	NB01	S_FF_FF_NB01_S_01_C_A	43538	Diversion	Lower overflow pipe invert to divert wet weather flows to Woodland Hills PS	276.77	73.81
Floyds Fork	NB01	S_FF_FF_NB01_S_03_C_A	43538	Conveyance	1,650 LF of pipe upgrades from 15" to 18"	11.05	13.86
Floyds Fork	NB01	S_FF_FF_NB01_S_09A_C_A	43538	Storage	In-line storage with 400 LF and 110 LF 48" pipes	11.00	13.95
Floyds Fork	NB02	S_FF_FF_NB02_S_09A_C_A	48464	Storage	In-line storage with 50 LF of 48" pipe	305.02	383.22
Floyds Fork	NB02	S_FF_FF_NB02_S_03_C_A	48464	Conveyance	Upgrade both pumps in the Eden Care PS to discharge 115 GPM	17.85	17.53
Floyds Fork	NB03	S_FF_FF_NB03_M_01_C_A	43504, 43563	Diversion	Divert flow from Ashburton PS by upgrading FM and adding gravity sewer (also eliminates the SSO at Olde Copper Ct PS)	150.66	161.00
Floyds Fork	NB03	S_FF_FF_NB03_M_03_C_B	43504, 43563	Conveyance	Upgrade FM for Olde Copper Ct PS and for Ashburton PS (will pass additional flow to Old Copper Ct PS)	111.57	106.61
Floyds Fork	NB03	S_FF_FF_NB03_M_HB_C_C	43504, 43563	Diversion & Conveyance	Remove Olde Copper Ct PS, use gravity sewer to divert flow to another part of the system, and upgrade FM for Ashburton PS	86.27	91.31
Floyds Fork	NB03	S_FF_FF_NB03_M_HB_C_A	43504, 43563	Conveyance & Storage	In-line storage with 320 LF of 42" pipe with a drop shaft, and upgrade FM for Ashburton PS	52.51	59.44
Floyds Fork	NB03	S_FF_FF_NB03_M_HB_C_B	43504, 43563	Conveyance & Storage	In-line storage with 150 LF of 60" pipe with a drop shaft upstream of Olde Copper Ct PS, upgrade FM for Ashburton PS	51.19	58.40
Floyds Fork	NB03	S_FF_FF_NB03_M_03_C_A	43504, 43563	Conveyance	Upgrade pumps in Olde Copper Ct PS, upgrade FM for the Ashburton PS (will pass additional flow to Old Copper Ct PS)	47.82	42.51
Floyds Fork	NB03	S_FF_FF_NB03_M_03_C_C	43504, 43563	Conveyance	Upgrade existing wet well and pumps at Olde Copper Ct PS, and upgrade FM for Ashburton PS	27.03	27.73
Hite Creek	MSD1082	S_CC_HC_MSD1082_S_09A_C	MSD1082, MSD1095-PS	Storage	Underground storage in line with the current influent line to the PS consisting of 476 LF of 10" pipes or another underground solution with equivalent capacity	9.43	12.06
Hite Creek	MSD1082	S_CC_HC_MSD1082_S_09B_C	MSD1082, MSD1095-PS	Storage	Above ground storage vault for off-line storage	8.69	8.57
Hite Creek	MSD1082	S_HC_HC_MSD1082_S_03_C	MSD1082, MSD1095-PS	Conveyance	Upgrade Meadow Stream PS to handle peak flows of approximately 4.5 MGD	3.19	2.81
Hite Creek	MSD1086	S_CC_HC_MSD1086_M_07_C_B	MSD1085, MSD1086, 90776, 108956	Conveyance	Inflow and Infiltration reduction by slip lining the suspected problem area south of the PS and near the PS drainage ditch	61.65	60.38
Hite Creek	MSD1086	S_CC_HC_MSD1086_M_07_C_A	MSD1085, MSD1086, 90776, 108956	Conveyance	Inflow and Infiltration reduction by slip lining the entire sewershed contributing to the PS	24.98	24.30
Hite Creek	MSD1086	S_CC_HC_MSD1086_M_03_C	MSD1085, MSD1086, 90776, 108956	Conveyance	Upgrade PS and FM to handle peak flow after buildout	22.10	22.12
Hite Creek	MSD1086	S_CC_HC_MSD1086_M_09A_C	MSD1085, MSD1086, 90776, 108956	Storage	In-Line storage	19.50	24.80
Hite Creek	MSD1085	S_CC_HC_MSD1085_S_03_C	MSD1085	Conveyance	Upgrade PS to handle peak flow after buildout	12.29	12.48
Hite Creek	MSD1086	S_CC_HC_CrestwoodPS_M_13_C	MSD1085, MSD1086, 90776, 108956	Conveyance	Take Floydsburg Road PS and Kavanaugh Road PS off line, construct interceptors to run south to a new regional PS to serve the whole Crestwood area, and construct a FM parallel to Floydsburg Road Interceptor	7.14	8.15
Hite Creek	MSD1085	S_CC_HC_MSD1085_S_09A_C	MSD1085	Storage	In-line overflow storage with the two PS influent lines	5.25	6.71
Jeffersontown	NB01	S_JT_JT_NB01_01_C	MSD0255, ISO28, 64505, 28391, 28392, 31733, 28395A	Diversion & Storage	Relief sewer from Grassland to the WWTP, storage at the plant and PS, FM installed to the BGI, some tunneling required	3.04	3.30
Jeffersontown	NB01	S_JT_JT_NB01_09_C	MSD0255, ISO28, 64505, 28391, 28392, 31733, 28395A	Diversion & Storage	Storage at Grassland and at the plant and PS, and a FM installed to the BGI	2.46	2.65
Jeffersontown	NB01	S_JT_JT_NB01_03_C	MSD0255, ISO28, 64505, 28391, 28392, 31733, 28395A	Conveyance	Wet weather PS at Grassland, storage and PS at the plant, and a FM installed from plant to the BGI	2.39	2.61

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MSD Louisville / Jefferson County Metropolitan Sewer District

PROJECT WIN

CURRENT PREFERRED SOLUTION

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Jeffersontown	NB02	S_JT_JT_NB02_01_C	98564, 28413, 28414, 28415, 28250, 28249, 28340, 28336, 99649	Conveyance	Upsizing pipe downstream of Charlane and Dell Road overflows, some tunneling required	39.48	49.40
Jeffersontown	NB02	S_JT_JT_NB02_09_C	98564, 28413, 28414, 28415, 28250, 28249, 28340, 28336, 99649	Storage	Underground off-line storage at Jeffersontown Swimming Pool and alongside manhole 103647	22.22	23.21
Jeffersontown	NB03	S_JT_JT_NB03_01_C	MSD0148-PS, MSD0149-PS, 28719, 28711	Diversion	Install 450 LF from Marion PS and 350 LF from Raintree PS to divert flows to the SED, also conveyance for overflow 25676	114.80	137.37
Jeffersontown	NB03	S_JT_JT_NB03_09_C	MSD0148-PS, MSD0149-PS, 28719, 28711	Conveyance & Storage	Underground off-line storage for Marion Ct PS, replace FM and pumps for Raintree PS, upsize gravity sewer downstream of FM	27.78	29.83
Jeffersontown	NB03	S_JT_JT_NB03_03_C	MSD0148-PS, MSD0149-PS, 28719, 28711	Conveyance	Replace FM for Raintree, replace pumps at Marion Ct PS and Raintree PS, and upsize gravity sewer downstream of the FM	25.51	27.31
Jeffersontown	NB04	S_JT_JT_NB04_09_C	29040, 64096, 86052	Storage	Off-line storage for MSD0196 and MSD0151	22.86	22.66
Jeffersontown	NB04	S_JT_JT_NB04_03_C	29040, 64096, 86052	Conveyance	Install 8,500 LF of FM for Chenoweth Run only (abandon but do not remove existing FM so it could be used later), replace pumps at Chenoweth Run PS and Monticello PS	20.99	17.36
Middle Fork	MF01	S_MISF_MF_NB01_M_01_C_A2	IS021, 08934SM, 47583, 02937, 02933, 47596, 45385,27005,23211	Diversion & Storage	Divert Upper Middle Fork PS to Hikes Lane Interceptor using existing pumps, open storage at Buechel Basin, covered storage at Breck Car Wash Lot, and upsize pipe downstream of 15138	1.27	1.37
Middle Fork	MF01	S_MISF_MF_NB01_M_01_C_A1	IS021, 08934SM, 47583, 02937, 02933, 47596, 45385, 27005, 23211	Storage	Divert Upper Middle Fork PS to Hikes Lane Interceptor using existing pumps, open storage at Buechel Basin, covered storage at Breck Car Wash Lot, upsize pipe downstream of 15138, and construct relief Middle Fork Interceptor sections	1.22	1.33
Middle Fork	MF01	S_MISF_MF_NB01_M_01_C_A3	IS021, 08934SM, 47583, 02937, 02933, 47596, 45385,27005,23211	Diversion & Storage	Divert Upper Middle Fork PS to Hikes Lane Interceptor using existing pumps, open storage at Buechel Basin, covered storage at Cannons Lane site, upsize pipe downstream of 15138, and construct relief Middle Fork Interceptor sections	1.22	1.33
Middle Fork	MF01	S_MISF_MF_NB01_M_01_C_B1	IS021, 08934SM, 47583, 02937, 02933, 47596, 45385,27005,23211	Diversion & Storage	Divert all necessary flow through Upper Middle Fork PS to Hikes Lane Interceptor by upgrading PS, open storage at Buechel Basin, upsize pipe downstream of 15138, and construct relief Middle Fork Interceptor sections	0.99	1.09
Middle Fork	MF01	S_MISF_MF_NB01_09B_C_A2	IS021, 08934SM, 47583, 02937, 02933, 47596, 45385,27005,23211	Diversion & Storage	No Upper Middle Fork PS diversion, small uncovered storage at Buechel Basin, significant covered storage at Oxmoor Mall Site, and upsize pipe downstream of 15138	0.81	0.89
Middle Fork	MF01	S_MISF_MF_NB01_09B_C_A1	IS021, 08934SM, 47583, 02937, 02933, 47596, 45385,27005,23211	Diversion & Storage	No Upper Middle Fork PS diversion to Hikes Lane, small open storage at Buechel Basin, large covered storage at Breck Car Wash Lot, upsize pipe downstream of 15138, and construct relief Middle Fork Interceptor sections	0.78	0.85
Middle Fork	MF04	S_MI_MF_NB04_03_C	21628-W, 46891, 91629, 91630	Conveyance	Upgrade Devondale PS, also upsize downstream FM and a significant amount of the downstream collectors and interceptors	Solution currently being evaluated at the 5-year design level.	
Middle Fork	MF04	S_MI_MF_NB04_09B_C	21628-W, 46891, 91629, 91630	Storage	Off-line storage near the Devondale PS	Solution currently being evaluated at the 5-year design level.	
Middle Fork	MF06	S_MI_MF_M_NB06_01_C_C	00746, MSD0057, 01106	Diversion & Storage	Two diversion gravity pipes, and storage at MSD0057-PS	32.26	39.83
Middle Fork	MF06	S_MI_MF_NB06_M_01_C_A	00746, MSD0057, 01106	Diversion	Three diversion gravity pipes (one at MSD0057)	20.86	25.39
Middle Fork	MF06	S_MI_MF_NB06_M_09_C	00746, MSD0057, 01106	Storage	Diversion at 01106, storage in 150 LF (at MSD0057) and 300 LF (at 00746) 72" pipe	27.70	35.42
Middle Fork	MF06	S_MI_MF_NB06_M_01_C_B	00746, MSD0057, 01106	Diversion	Two diversion gravity pipes, and MSD0057-PS upgrades with flow diverted to 00746 diversion	20.10	23.05
Middle Fork	MF06	S_MI_MF_NB06_M_03_C	00746, MSD0057, 01106	Conveyance	Upsize PS, increase size of FM, upsize downstream collector	5.34	6.11
Mill Creek	81814-W	S_MC_ALL_Storage and Conveyance SOLN	81814-W, MSD0047-PS, MSD0050-PS	Storage		41.58	51.97
Mill Creek	81814-W	S_MC_ALL_Storage and Conveyance SOLN	81814-W, MSD0047-PS, MSD0050-PS	Conveyance		19.03	23.78

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PROJECT WIN

CURRENT PREFERRED SOLUTION

Watershed/Geo-graphic Region	Main SSO or Branch ID	Project or Cost Sheet Name	Documented and Suspected SSOs Addressed	Solution Technology	Project Description	Weighted Benefit/ Cost Ratio (Capital Costs)	Weighted Benefit/Cost Ratio (Total Present Worth Costs)
ORFM	NB01	S_OR_MF_NB01_01_C	MSD0023-PS, MSD0007-PS, MSD0010-PS, 26752, 41416, 24472	Diversion & Conveyance	Replace approximately 2,000 LF of gravity sewer flowing into MSD0007, upgrade storage at MSD0023, install 400 LF of pipe for Winton diversion and 2,200 LF of pipe for Mockingbird diversion	26.32	31.31
ORFM	NB01	S_OR_MF_NB01_03_C	MSD0023-PS, MSD0007-PS, MSD0010-PS, 26752, 41416, 24472	Conveyance	Replace approximately 2,000 LF of gravity sewer flowing into MSD0007, upgrade pumps at MSD0007 and MSD0010, total PS upgrade of MSD0023, upsize 2,000 LF of FM for MSD0007, and upsize 1,240 LF of FM for MSD0023	23.89	27.89
ORFM	NB01	S_OR_MF_NB01_09_C	MSD0023-PS, MSD0007-PS, MSD0010-PS, 26752, 41416, 24472	Diversion & Storage	Replace approximately 200 LF of gravity sewer flowing into the storage area for MSD0007, divert MSD0010	20.18	21.17
ORFM	NB01	S_OR_MF_NB01_01_C_A	MSD0023-PS, MSD0007-PS, MSD0010-PS, 26752, 41416, 24472	Diversion	Replace approximately 2,000 LF of gravity sewer flowing into MSD0007, total PS upgrade of MSD0023, upsize 1,240 LF of FM for MSD0023, install 400 LF of pipe for Winton diversion and 2,200 LF of pipe for Mockingbird diversion	10.51	11.40
ORFM	NB02	S_OR_MF_NB02_03_B	96020	Conveyance	Relief sewer for Leland Road overflow with 320 LF of pipe	94.45	113.34
ORFM	NB02	S_OR_MF_NB02_09_B	96020	Storage	Off-line storage pumps potentially along the gravity sewer in the rear of some houses along Leland, storage in the area is difficult due to lack of available land	14.20	12.76
ORFM	NB03	S_OR_MF_NB03_09_C_B	MSD0095-PS	Storage	Divert flow to an open area between the edge of pavement of Derington Court and the creek into an off-line storage basin	24.92	24.92
ORFM	NB03	S_OR_MF_NB03_03_C	MSD0095-PS	Conveyance	Upsize pumps in Derington Ct PS and upsize FM	16.24	13.68
ORFM	NB03	S_OR_MF_NB03_09_C_A	MSD0095-PS	Storage	In-line storage by installing 290 LF of 60" pipe parallel to the gravity line running down Derington Ct to Derington Ct PS	14.38	18.35
SED	NB03	S_SD_MF_NB03_09B_C	47250	Storage	Off-line closed storage in open field adjacent to SSO	13.78	13.85
SED	NB03	S_SD_MF_NB03_01_C	47250	Conveyance	2,400 LF of 10" relief sewer that parallels the existing sewer along Rustic Way mainly in the R/W outside of the pavement	9.95	12.32
SED	NB04	S_SD_MF_NB04_09B_C	25676	Storage	Off-line storage in the school property adjacent to the SSO	1.21	1.20
SED	NB04	S_SD_MF_NB04_01_C	25676	Conveyance & Diversion	3,160 LF of 12" relief interceptor but the alignment could change if the Jeffersontown diversion is a gravity interceptor along the South Fork in which case this interceptor would increase to 30"	0.57	0.72
SED	NB05	S_SD_MF_NB05_09B_C	16649, 51594	Storage	Off-line storage in an open field on Atherton High School Property for Sutherland SSO, no solution for 51594	32.41	32.41
SED	NB05	S_SD_MF_NB05_01_C	16649, 51594	Conveyance	Upsize gravity pipe along rear yards to eliminate Sutherland SSO possibly with pipe-bursting, no solution for 51594	27.41	33.71
Berrytown	NB01	S_FF_BT_NB01_S_09A_C_B	MSD0199-LS	Storage	Off-line underground storage basin prior to Lucas Lane LS	101.60	106.29
Berrytown	NB01	S_FF_BT_NB01_S_09A_C_A	MSD0199-LS	Storage & Conveyance	Install 180 LF of 36" pipes that branch off the gravity main prior to the Lucas Lane PS, increase the size of said gravity main	85.34	107.09
Berrytown	NB01	S_FF_BT_NB01_S_03_C_A	MSD0199-LS	Conveyance	Upgrade pumps at PS to have a fixed discharge of 76 GPM	77.46	71.41
Hunting Creek North	NB01	S_HC_HN_NB01_S_09A_C_A	43750	Storage & Conveyance	In-line storage with 30" pipe off gravity main prior to the Riding Ridge LS, and increase the gravity main	21.57	27.45
Hunting Creek North	NB01	S_HC_HN_NB01_S_03_C_A	43750	Conveyance	Upgrade pumps at Riding Ridge PS to 24 GPM	36.81	28.22
Hunting Creek North	NB01	S_HC_HN_NB01_S_03_C_B	43750	Conveyance	Increase FM size leaving Riding Ridge PS	24.95	24.12
Hunting Creek North	NB02	S_HC_HN_NB02_S_09A_C_B	43411	Storage	install 185 LF of 48" in-line storage pipe	72.20	92.26
Hunting Creek North	NB02	S_HC_HN_NB02_S_09A_C_A	43411	Storage	install 120 LF of 60" in-line storage pipe	55.15	70.17
Hunting Creek North	NB02	S_HC_HN_NB02_S_03_C_A	43411	Conveyance	Upgrade pumps, wet well, and FM at the Gunpowder PS	8.87	9.09
Hunting Creek South	NB01	S_HC_HS_NB01_S_09A_C_B	43512	Storage	Install an off-line storage basin prior to Fairway View PS	47.40	54.96
Hunting Creek South	NB01	S_HC_HS_NB01_S_09A_C_A	43512	Storage	Replace first two segments of gravity sewer north and east of the Fairway View PS with in-line storage pipe, and new pipe entrances for the larger pipe diameters	25.58	32.05
Hunting Creek South	NB01	S_HC_HS_NB01_S_03_C_A	43512	Conveyance	Upgrade pumps at PS to discharge 95 GPM	17.31	16.28
Hunting Creek South	NB01	S_HC_HS_NB01_S_13_C_A	43512	Conveyance	Upgrade pumps to 95 Gem, upsize north and east gravity sewers upstream of PS, and new pipe entrances drilled into wet well for the larger pipe diameters	10.25	10.20
Hunting Creek South	NB02	S_HC_HS_NB02_S_09A_C_A	16222	Storage	Replace two gravity sewers immediately upstream of the Deep Creek Lift Station with a 150 LF-36" and a 170 LF-30" pipe respectively for in-line storage	61.96	78.33
Hunting Creek South	NB02	S_HC_HS_NB02_S_13_C_A	16222	Conveyance	Upgrade pumps and replace the 8" gravity sewer immediately upstream of the LS with a 36" pipe	22.91	23.13
Hunting Creek South	NB02	S_HC_HS_NB02_S_03_C_A	16222	Conveyance	Replace lift station with a larger lift station	7.89	8.79

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Lake Forest	NB01	S_FF_LF_NB01_S_09A_C_D	43614	Storage	Install 65 LF of 60" pipes for in-line storage east of the Lift Station, and replace 8" sewer south of that with a 36" pipe	59.31	75.48
Lake Forest	NB01	S_FF_LF_NB01_S_09A_C_A	43614	Storage	Upgrade gravity mains on both sides of the Lake Forest Lift Station with 130 LF of 36" pipe for in-line storage, also replace 180 LF with 42" pipe	43.13	54.90
Lake Forest	NB01	S_FF_LF_NB01_S_13_C_A	43614	Diversion & Storage	Divert flow from 88655 to 80472, and upgrade 8" sewer immediately upstream (and west) of Lift Station with a 85 LF 38" pipe	30.44	37.59
Lake Forest	NB01	S_FF_LF_NB01_S_03_C_A	43614	Conveyance	Upgrade pumps at the Lake Forest LS to discharge 118 GPM	30.46	29.04
Pond Creek	PC02	S_PO_WC_PC02_M_0109B_C	MSD0143-PS	Conveyance & Storage	Open off-line storage at Park Ridge Woods with gravity operated connection to wet well, upsize downstream to eliminate excess surcharging	4.51	5.31
Pond Creek	PC02	S_PO_WC_PC02_M_010309B_C	MSD0143-PS	Conveyance & Storage	Open off-line storage (large wet well) at Park Ridge Woods with pump connection, some PS upgrades, and upsizing downstream	3.42	4.08
Pond Creek	PC02	S_PO_WC_PC02_M_0103_C	MSD0143-PS	Conveyance	Upgrade Park Ridge Woods PS, upgrade sewers and FM upstream of Park Ridge, and upsize downstream to eliminate excess surcharging	2.67	3.33
Pond Creek	PC03	S_PO_WC_PC03_M_01_C	25480	Diversion	Charleswood Subdivision Interceptor will possibly eliminate Cooper Chapel PS, upsize pipes downstream	10.74	13.54
Pond Creek	PC04	S_PO_WC_PC04_M_03_C	MSD1013-PS, 35308, 35309	Conveyance	Upgrade Cinderella PS	148.01	152.64
Pond Creek	PC04	S_PO_WC_PC04_M_0309B_C	MSD1013-PS, 35308, 35309	Storage	Off-line pumped open storage basin at Cinderella PS	63.78	60.21
Pond Creek	PC04	S_PO_WC_PC04_M_0109B_C	MSD1013-PS, 35308, 35309	Storage	Off-line gravity operated open storage basin at Cinderella PS	58.82	57.11
Pond Creek	PC05	S_PO_WC_PC05_M_0109B_C	MSD0101-PS, 25484, 93719	Storage & Conveyance	Upgrade Lantana PS, upgrade FM, and additional conveyance improvements needed to carry flow to the PS and downstream of FM	82.41	68.87
Pond Creek	PC05	S_PO_WC_PC05_M_010309B_C	MSD0101-PS, 25484, 93719	Storage & Conveyance	Pumped open off-line storage (large wet well) at Lantana PS, and conveyance improvements needed to carry flow to the PS	67.70	63.00
Pond Creek	PC05	S_PO_WC_PC05_M_0103_C	MSD0101-PS, 25484, 93719	Conveyance	Upgrade Lantana PS, upgrade FM, and additional conveyance improvements needed to carry flow to the PS and downstream of FM	45.11	49.74
Pond Creek	PC06	S_PO_WC_PC06_M_010309B_C	MSD0180-PS	Storage	Pumped covered off-line storage basin at the Government Center PS, additional gravity improvements required in area	11.84	12.40
Pond Creek	PC06	S_PO_WC_PC06_M_0103_C	MSD0180-PS	Conveyance	Upgrade Government Center PS, replace FM, additional gravity improvements required in area to eliminate excessive surcharging	11.41	12.76
Pond Creek	PC06	S_PO_WC_PC06_M_0109B_C	MSD0180-PS	Storage	Gravity operated off-line covered storage basin at the Government Center PS, additional gravity improvements required in area	10.61	11.36
Pond Creek	PC07	S_PO_WC_PC07_M_0103_C	21229-W	Conveyance	Upgrade Avanti PS, additional gravity improvements required in area	13.07	15.45
Pond Creek	PC07	S_PO_WC_PC07_M_0109B_C	21229-W	Storage	Open off-line gravity storage basin (large wet well) at Avanti PS connected to wet well, some downstream improvement required to eliminate surcharging	12.31	13.28
Pond Creek	PC07	S_PO_WC_PC07_M_0309B_C	21229-W	Storage	Pumped open off-line storage (large wet well) at Avanti PS connected to existing wet well, assumed small structure needed for connection pumps band partial sharing of Avanti assets	10.26	11.49
Pond Creek	PC08	S_PO_WC_PC08_M_0103_C	19369, 29933, 29943, 31083, 31084, 57874, 74846, 79076, 102675	Conveyance	Restore Lea Ann Way PS to 22 MGD capacity, some upstream improvements needed to eliminate excess surcharging	12.03	12.70
Pond Creek	PC08	S_PO_WC_PC08_M_0109B_C	19369, 29933, 29943, 31083, 31084, 57874, 74846, 79076, 102675	Storage & Conveyance	Gravity operated off-line storage basin at Lea Ann Way PS, some upstream improvements needed to eliminate excess surcharging, some clear and grubbing may be needed in sewers behind houses	11.45	12.83
Pond Creek	PC08	S_PO_WC_PC08_M_0309B_C	19369, 29933, 29943, 31083, 31084, 57874, 74846, 79076, 102675	Storage & Conveyance	Off-line storage basin at Lea Ann Way PS operated by pumping, some clear and grubbing may be needed in sewers behind houses	11.28	12.55
Pond Creek	PC09	S_PO_WC_PC09_M0109B_C	27116, 61732, 70212, 35410, 35414	Storage & Conveyance	Off-line gravity storage at Caven Avenue PS behind the Meijer on Preston Highway near South Park PS, additional improvements needed	5.46	6.06
Pond Creek	PC09	S_PO_WC_PC09_M0309B_C	27116, 61732, 70212, 35410, 35414	Storage & Conveyance	Off-line pumped storage at Caven Avenue PS and near the Meijer on Preston Highway to alleviate overflows and excessive surcharging	3.79	4.37
Pond Creek	PC09	S_PO_WC_PC09_M_0103_C	27116, 61732, 70212, 35410, 35414	Conveyance	Upsize Caven Avenue PS, additional gravity pipes in Okolona area, upsize Caven FM	2.73	3.41

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Pond Creek	PC10	S_PO_WC_PC10_M_0109B_C	36419, 55290, 57973	Storage	Add gravity operated off-line storage to small pump stations (Francell, Leven, Sunlight, and Waycross) to alleviate surcharging, and gravity basin in the Jefferson Mall area	5.92	6.86
Pond Creek	PC10	S_PO_WC_PC10_M_0309B_C	36419, 55290, 57973	Storage	Add pumped operated off-line storage to small pump stations (Francell, Leven, Sunlight, and Waycross) to alleviate surcharging, and stand-alone storage in in the Jefferson Mall area	5.04	5.90
Pond Creek	PC10	S_PO_WC_PC10_M_0103_C	36419, 55290, 57973	Conveyance	Upgrade Sunlight PS, Leven PS, Francell PS, and Waycross PS in downstream system to alleviate surcharging and overflows	3.13	3.82
CSO	42007	S_OR_MF_42007_01_CV	42007	Conveyance	Expand wet well in the PS and increase pumping capacity	245.14	153.90
CSO	42007	S_OR_MF_42007_01_ST	42007	Storage	Off-line storage basin to store excess wet weather flows	33.03	26.26
CSO	30917	S_SF_MF_30917_01_CV_A	30917, 31284, 31226	Conveyance	Replace 44,000 LF of sanitary sewer system	2.38	3.00
CSO	30917	S_SF_MF_30917_01_ST	30917, 31284, 31226	Storage	Off-line storage basin to store excess wet weather flows	41.25	41.48

***SSOs eliminated by projects considered part of the baseline conditions are not included in this spreadsheet.**

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SSO SSDP
Modeled Solutions
Project Fact Sheet

PROJECT WIN

SSO Project Number:	S_MI_MF_NB06_09_C
Modeled Area:	Middle Fork
Branch or SSO ID:	MF06
Project Type:	Storage
Receiving Stream:	Middle Fork
Project Description:	This alternative includes a diversion at 01106, and storage at MSD 0057 and 00746 with 150 LF and 300 LF of 72 inch RCP, respectively.
Reason for Overflow:	Bypass Pipe at Vannah Way, Undersized Pumps at Anchor Estates # 1 and # 2.
Design Parameters / Assumptions:	This solution is based on a 2 year - 3 hour rain event
Project Constraints:	None at this time
Estimated Capital Cost (2010 dollars):	$2,072,465
Weighted Benefit/Cost Ratio (Capital Cost):	27.70

Overflow Points Addressed:

SSO	SSO Name	Service Area	Overflow Type	Discharge To	Average Overflow / Incident (gallons)	Number of Overflow/ Yr
00746	Anchor Estates # 1 PS	Morris Forman	Pumped	Ditch	8,023	27.6
MSD0057	Anchor Estates # 2 PS	Morris Forman	Capacity	Stream	9,183	31.0
01106	Foxboro Dr / End of St PS	Morris Forman	Bypass	Catchbasin	No Data	1.7

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Project Cost Summary Sheet

Project ID: *S_MI_MF_NB06_M_09_C*

Description: Diversion at 01106: Storage at MSD 0057 and 00746 with 150 LF and 300 LF of 72" RCP, respectively

Estimate Date: 5/16/2008

Prepared By: Bill Sanders, P.E. Heritage Engineering Printed Date: 6/18/2008

Cost Estimate Description		Totals
Estimated Open Cut Sewer Construction Cost	$	1,166,000
Estimated Tunneling Construction Cost	$	-
Estimated Off-line Storage Facilities Construction Cost	$	-
Estimated I/I Removal Cost	$	-
Estimated Pump Station Cost	$	-
Estimated Flow Control Structure	$	-
Estimated Earthen Basin Cost	$	-
Estimated Force Main Cost	$	-
Estimated High Rate Treatment Cost	$	-
Estimated Screening Cost	$	-
Misc. Extra Cost Description:	$	-
Total Estimated Construction Cost =	**$**	**1,166,000**

Real Estate Costs Description			Totals
Easement Cost	# of Properties =	0	$ -
Property Acquisition			$ -
Misc. Extra Cost Description:			$ -
Total Additional Costs =			**$ -**

Multipliers Description	Multiplier
Administration Costs	4%
Contingencies	25%
Interest	6%
Miscellaneous	9%
Engineering & Inspection	8%
Design Services	5%
Program Management	4%
Planning & Preliminary Design	2%
Performance Bond	1%
Total Multipliers =	**64%**

Data File Base ENRCCI	7312	**PROJECT CAPITAL COST ESTIMATE =**	$ 1,912,000
Data File ENRCCI in use	7888	**Project 20 Year Present Worth Estimate =**	$ 1,495,000

For Economy of Scale when dealing with the facility worksheets for a facility whose size is far greater than the largest available on the curve use the following Economy of Scale equation to adjust the cost and enter the adjustment in the Misc. Extra Cost: (Professional Engineering judgement to be used for decision to use this adjustment.)

$$C = Cr (Qc / Qr) ^ m$$

Cr = cost from tool at maximum size for facility cost curve

Qc = design size

Qr = maximum size for facility from cost curve

C = cost for design size Qc

m = correlation exponent (0 < m < 1) Use 0.6 for all structures.

EXAMPLE: For a BF facility of 500 MGD where 100 is the maximum size on the curve use:

C = $41,686,164 * (500 / 100) ^ 0.6	=	$	109,489,869
C500 from Tool	=	$	208,281,000
Difference (C - C500)	=	**$**	**(98,791,131)**

Enter the Difference as a negative value in the Misc. Extra Cost row and enter in Economy of Scale Adjustment in the Description.

Benefit/Cost Model Cost Data		
Capital Cost	$	2,072,465
Total Present Worth	$	1,620,468

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ENRCCI overwrite by Estimator: 8550

PROJECT CAPITAL COST ESTIMATE =	**$**	**2,072,465**
Project 20 Year Present Worth Estimate =	**$**	**1,620,468**
Construction Cost Estimate =	**$**	**1,263,856**

Project Values Summary Sheet

Value Description	Totals
Length of Open Cut Sewer Conveyance (Feet)	800
Length of Tunnel Sewer Conveyance (Feet)	0
Off-line Storage Annual Volume Stored (Million Gallons)	0
Off-line Storage Estimated # of Annual Occurrence	0
Flow Control Structure Annual Volume Stored (Million Gallons)	0
Flow Control Structure Estimated # of Annual Occurrence	0
Earthen Basin Annual Volume Stored (Million Gallons)	0
Earthen Basin Estimated # of Annual Occurrence	0
Annual Volume of Pumping (Million Gallons)	0
Estimated Total Dynamic Head of Pumping (Feet)	0
Length of Force Main Conveyance (Feet)	0
Annual Volume of High Rate Treatment (Million Gallons)	0
High Rate Treatment Estimated # of Annual Occurrences	0
Screening Estimated # of Annual Occurrences	0
Screening Annual Volume Disinfected	0

MSD

OPEN CUT SEWER CONSTRUCTION VALUE ENTRY SHEET

Project ID: *S_MI_MF_NB06_M_09_C*

Estimate Date: 5/16/2008

Printed Date: 6/18/2008

Prepared By: Bill Sanders, P.E. Heritage Enginee

Segment ID	*Pipe Size (in)	Length of Pipe in Street (ft)	Length of Pipe out of Street (ft)	**Average Depth (ft)	# of San. Service Laterals	# of Aband'd Inlets	# of New Inlets	# of Water Services Replaced	Street Width (ft)	# of Manholes	# of Diversion Structures	# of Existing MH Surface Rehabs	Small Medium or Large Creek Crossing (S,M, or L)	Sewer in Rock	Dewatering Required	Maintenance of Flow	Brownfields	Clearing and Grubbing	Traffic Maintenance Required	Urban Alignment	Total Cost Per Segment
01106	8	100	250	5	0	0	0	0	20	2	0	0		x	x			x	x		$ 51,262
00746-Storage	72	300	0	13	0	0	0	0	22	2	1	0		x	x				x		$ 498,775
MSD0057 Storage	72	150	0	13	0	0	0	0	22	2	1	0		x	x				x		$ 314,333
																					$ -

800 = Total Length of Open Cut Job

800 = Total Length of Sanitary Sewer in Rock

Total Cost for Construction = $ 864,369

Small Job Multiplier = 35%

Estimated Total Sewer Construction Cost = $ 1,166,172

* - Use standard pipe sizes with maximum pipe size of 144 inches

** - Minimum depth is 5 feet. For depths that are greater than 25 feet use Tunneling worksheet

Cluster Comparison

S_MI_MF_NB06_09_C Divert 01106, Storage at MSD 0057 and 00746

CSO/SSO ID[5]		Raw Benefit Score[2,4] Regulatory Performance	Public Health	Asset Protection	Environmental Enhance	Eco-Friendly Solutions
01106		12	0	3	2	-1
00746		21	10	3	2	-1
MSD0057		12	3	3	2	-1
000		0	0	0	0	0
000		0	0	0	0	0
000		0	0	0	0	0
000		0	0	0	0	0
000		0	0	0	0	0
Weighting Factor		8	10	6	8	6
Weighted Benefit Score		360	130	54	48	-18
Total Benefit Score	574					
Total Capital Cost[3]	$2,032,000					
Total Present Worth Costs[3]	$1,589,000					
Weighted Benefit/Cost Ratio (Capital Costs)	28.25					
Weighted Benefit/Cost Ratio (Total Present Worth Costs)	36.12					

Notes:

1. Data Input Cells are highlighted in yellow
2. Raw Benefit Scores for Regulatory Performance and Public Health values are from the CSO or SSO Level of Control Benefit Sheets
3. Capital and Total Present Worth Costs from the"Proj Summary" Page of the Cost Model for the clustered alternative
4. Formulas are referenced based on existing template layout, if template is changed make sure to double check referenced cells highlighted in gray
5. Use treatment plant name as ID for CSO/SSO projects that require improvements to the treatment plant

2-Year	Network Branch #6										
Value:	Regulatory Performance - SS0s										
	Measure	Impact / Frequency						Rationale	Measurement Method		
Performance Measure	SSOs	6 month	1 Year	2 Year	5 Year	10 Year	Modeled Overflow Point or No discharge	Regulations do not distinguish between potential impact of SSOs, therefore frequency and impact are the same for Regulatory Performance value.. Modeled Overflow Points are not considered until verified.	Measurement methods will be via hydraulic models to quantify the SSO discharge.		
Frequency	Value	25	16	9	4	1	0		Base	Prop	
	01106		BL		PR				16	4	12
	00746	BL			PR				25	4	21
	MSD0057-LS		BL		PR				16	4	12
Note - This value sheet calculates the total benefit.									Subtotal		45

Acronyms

AAOV - Average annual overflow volume
CSO - Combined sewer overflow
WQS - Water quality standards
WWTPs - Wastewater treatment plants
BL - Baseline
PR - Proposed

01106 - 2 YR	Network Branch #6										
Value:	Public Health Enhancement - SSOs										
	Measure	Release Impact						Rationale	Measurement Method		
Performance Measures	SSOs	Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals	Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals	Release 50,000 - 99,999 Gals	Release 20,000-49,999 Gals	Release 10,000 - 19,999 Gals	No discharge	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	6 Month	25	20	15	10	5	0		0	0	0
	1 Year	20	16	12	8	4	0	1,000 GL BL	0	0	0
	2 Year	15	12	9	6	3	0	2,000 GL BL	0	0	0
	5 Year	10	8	6	4	2	0	5,000 GL BL	0	0	0
	10 Year	5	4	3	2	1	0	8,000 GL BL	0	0	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								Average Total Score			0
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system BL - Baseline GL - Gallons								Corrected Score			0

00746 - 2 YR	Network Branch #6										
Value:	**Public Health Enhancement - SSOs**										
	Measure	**Release Impact**						**Rationale**	**Measurement Method**		
Performance Measures	**SSOs**	**Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals**	**Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals**	**Release 50,000 - 99,999 Gals**	**Release 20,000-49,999 Gals**	**Release 10,000 - 19,999 Gals**	**No discharge**	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	**6 Month**	25	20	15	10	5	0	10,000 Gal BL	5	0	5
	1 Year	20	16	12	8	4	0	30,000 Gal BL	8	0	8
	2 Year	15	12	9	6	3	0	60,000 Gal BL	12	0	12
	5 Year	10	8	6	4	2	0	100,000 GL BL	8	4	4
	10 Year	5	4	3	2	1	0	150,000 GL BL	4	4	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								**Average Total Score**			6
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system		BL - Baseline GL - Gallons						**Corrected Score**			10

MSD0057-LS - 2 YR Network Branch #6											
Value:	Public Health Enhancement - SSOs										
	Measure	Release Impact						Rationale	Measurement Method		
Performance Measures	SSOs	Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals	Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals	Release 50,000 - 99,999 Gals	Release 20,000-49,999 Gals	Release 10,000 - 19,999 Gals	No discharge	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	6 Month	25	20	15	10	5	0		0	0	0
	1 Year	20	16	12	8	4	0	6,000 GL - BL	0	0	0
	2 Year	15	12	9	6	3	0	25,000 GL - BL	6	0	6
	5 Year	10	8	6	4	2	0	60,000 GL - BL	8	6	2
	10 Year	5	4	3	2	1	0	100,000 GL - BL	4	4	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								Average Total Score			2
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system BL - Baseline GL - Gallons								Corrected Score			3

S_MI_MF_NB06_09_C														
Value:	**Asset Protection**													
	Measure			**Impact**						**Rationale**	**Measurement Method**			
Performance Measures		Flood Damage		Homes or businesses are subject to severe structural damage	Homes or businesses are subject to minor to moderate structural damage	Flooding limits access to homes or businesses	Flooding limits access to recreational areas	Standing water on property, but access not affected and no damage expected	No standing water	Stormwater BMPs can reduce stormwater peaks and reduce extent of flooded areas, while sewer separation may increase localized stormwater peak flows and increase the flooding impacts of storms. Alternatively, purchase of highly impacted properties may be a cheaper way to reduce flood damage and create green space and buffer zones.	Drainage models where available, historic customer complaints from MSD Customer Information System, or historic observations of flood-prone areas combined with the expected relative impacts of sewer system modifications on storm water flows.			
		Basement Back-ups		Sewer surcharging within 6 feet of ground surface for more than 20% of manholes	Sewer surcharging within 6 feet of ground surface for 10 - 20% of manholes	Sewer surcharging within 6 feet of ground surface for 5 - 10% of manholes	Sewer surcharging within 6 feet of ground surface for 1 - 5% of manholes	Sewer surcharging within 6 feet of ground surface for 0 - 1% of manholes	No surcharging within 6 feet of ground surface	First floor levels are typically 1 - 2 feet above ground surface, and basement floors are typically 8 - 10 feet below the first floor. A sewer surcharge of 6 feet below ground surface is highly likely to cause back-ups in homes with basement service.	Measurement methods will be via hydraulic models to quantify the hydraulic grade lines compared to ground surface elevations at manholes.			
	Storm Events	→ / ↓		Most Severe Impact				Least Impact	No Impact					
				5	4	3	2	1	0	Assumptions	Base Case Score	Alternative Score	Total Score	
Frequency	6 Month	Most Likely	5	25	20	15	10	5	0		10	5	5	
	1 Year		4	20	16	12	8	4	0		8	4	4	
	2 Year		3	15	12	9	6	3	0		6	6	0	
	5 Year		2	10	8	6	4	2	0		4	4	0	
	10 Year	Least Likely	1	5	4	3	2	1	0		3	2	1	
	Not Possible	Not Possible	0	0	0	0	0	0	0		Average			2
											Total Score			3

Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.

Acronyms
BMPs - Best management practices

S MI MF NB06 09 C													
Value:	Environmental Enhancement												
	Scoring												
Aspect	-5	-4	-3	-2	-1	0	1	2	3	4	5	Assumptions	Score Per Aspect
Aquatic and Terrestrial Habitat Protection	Elimination or habitat for rare or endangered species	Elimination of significant amount of common habitat	Elimination of entire amount of common habitat	Significant habitat impairment	Minor impairment to existing habitat	No impact on habitat	Minor enhancement of existing habitat	Significant enhancement of existing habitat	Creation of minor amount of common habitat	Creation of significant amount of common habitat	Creation of critical habitat for rare or endangered species		0
Aesthetics - Solids and Floatables	Flow reduction in volume of flow with no SAT capture	No SAT or flow with no SAT remains	25 - 50% of flow with no SAT remains	1 - 25% of flow with no SAT remains	Reduced efficiency of existing SAT control device (i.e. 10% of flow with no SAT remains)	No change in SAT removal	1 - 10% of discharged flow treated with positive SAT removal (screens)	10 - 25 % of discharged flow treated with positive SAT removal (screens)	25 - 50% of discharged flow treated with positive SAT removal (screens)	50 - 75% of discharged flow treated with positive SAT removal screens	75% - all discharged flow treated with positive SAT removal (screens)		0
Aesthetics - Odor and Air Emissions	Create annoying odor source affecting >20 customers	Create annoying odor source affecting >20 customers under all conditions and weather	Create annoying odor source affecting >20 customers occasionally	Create detectable odor source affecting >20 customers	Create detectable odor source affecting <20 customers	No impact on odors	Remove odor from odor source affecting 1-10 customers occasionally	Eliminate detectable odor source affecting 1-10 customers often	Eliminate annoying odor source affecting <20 customers occasionally	Eliminate annoying odor source affecting >20 customers often (5 - 20 customers occasionally)	Eliminate annoying odor source affecting >20 customers often		0
Dissolved Oxygen Impacts	Reduction of in stream DO by 2 mg/l + during critical flow periods	Continuous reduction of in stream DO of 2 mg/l +	Continuous reduction of in stream DO of 0 - 2 mg/l (possible reduction of in stream DO 2 - 4 mg/l during storm conditions	Intermittent reduction of in stream DO 1 mg/l - (possible reduction of in stream DO 2 - 4 mg/l during critical conditions)	Intermittent reduction of in stream DO 0 - 2 mg/l (possible during rare critical conditions)	No DO impacts	Intermittent improvements of in stream DO 1 - 2 mg/l	Intermittent improvement to ambient DO 2 mg/l + (intermittent critical condition improvements 0 - 2 mg/l	Continuous improvement of in stream DO 1 mg/l (intermittent critical condition improvements 2 - 4 mg/l	Continuous improvement of in stream DO 1 mg/l +	Continuous improvement of critical condition in stream DO 2 mg/l		0
Downstream Impacts	10%+ increase in annual BOD or nutrient loads	5% - 10% increase in annual BOD or nutrient loads	2.5 - 5.0% increase in annual BOD or nutrient loads	1 - 2% increase in annual BOD or nutrient loads (CSO + runoff)	Potential (< 1%) increase in annual average BOD or nutrient loads (CSO + runoff)	No impact on BOD or nutrient loads (CSO + runoff)	0 - 2% reduction in annual BOD or nutrient loads (CSO + runoff)	2 - 5% reduction in annual BOD or nutrient loads (CSO + runoff)	5 - 7.5% reduction in annual BOD or nutrient loads (CSO + runoff)	7.5 - 10% reduction in annual BOD or nutrient loads (CSO + runoff)	10%+ reduction in annual BOD or nutrient loads (CSO + runoff)		0
Stream Flow Impacts (Peak flows)	20%+ increase in peak flows	10% - 20% increase in peak flows	Up to 10% increase in peak flows	Frequent increase in flow during critical conditions	Possible increase in average flow, or minor increase in high flow years	No impact on peak flows	Minor reduction in flows, no significant peak reduction	Minor reduction in peak flows under some conditions	Up to 10% reduction in peak flows	10% - 20 % reduction in peak flows	20%+ reduction in peak flows		0
Stream Flow Impacts (DWF only)	20%+ decrease in flow during critical conditions	10% - 20 % decrease in flow during critical conditions	5 -10% permanent decrease of flow during critical conditions	Frequent decrease in flow during critical conditions	Possible decrease in average flow	No impact on average or base stream flow	Intermittent increase in stream flow - not limited to critical conditions	Intermittent increase in stream flow - often important critical conditions	0 - 10% permanent increase in stream flow during critical conditions	10 - 20 % permanent increase in stream flow during critical conditions	20%+ permanent increase in stream flow during critical conditions		0

Instructions: (1.) Score each alternative for each of the seven aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "fatal flaw". Alternatives that score in this area should not be proposed.	Total Raw Score Calculated	0
	Total Score Defaults	0

Aspect	Rationale	Measurement Method
Aquatic and Terrestrial Habitat Protection	Wet weather projects may affect both aquatic and terrestrial habitat through changes in basic flow, peak flow, water quality, tree cover, channel shape and characteristics etc. Predictive models used to evaluate wet weather control measures have a limited ability to predict biological diversity changes, erosion impacts etc. so surrogate metrics must be used to estimate future positive and negative impacts.	Project definition may specifically address changes in channel shape and configuration, tree cover etc. Predictive models will address DO and other water quality impacts. Flow models will predict basic flow and peak flow ratios to allow estimates of changes in erosion and water surface area.
Aesthetics - Solids and Floatables	Most CSUs have some form of solids and floatables control baffles. Improvements in capture rates can be expected with screening or other advanced treatment options. Storm water retention, constructed wetlands, and other control systems may provide solids and floatables removal as well. While reduction in solids and floatables removal efficiency is not likely, priority points will be assessed if this is possible with any alternative.	Current solids and floatables removal efficiency has been estimated for all sites with control technology. Improvements in removal efficiencies will be estimated for all alternatives that add screening or other advanced treatment technologies. Where treatment is proposed for storm water discharges removals will be estimated based on published removal data.
Aesthetics - Odor and Air Emissions	Odors and air emissions can be generated in storage systems, pump stations, force mains, and long flat sewers. Odors are generally characterized by both the intensity and the quality of the odor. Detectable and annoying are two common descriptors of different intensities and qualities of odors from sewage handling facilities.	Odor emissions from sewage handling facilities can be modeled for intensity, quality, and geographic spread. For planning purposes this level of evaluation is not common, and will not be done except in very rare circumstances. The potential for odor and air emissions will be estimated based on typical applications and model predictions for storage time, number of events, average flow velocities etc.
Dissolved Oxygen Impacts	Dissolved oxygen in streams is dependent on a variety of factors including BOD load, nutrient load, stream flow velocity, water temperature, etc.	For BGC the Water Quality Tool will be used to estimate the impacts of various loading conditions, flows, temperatures, etc. Probable impacts of individual projects will be estimated based on comparisons to the various stream condition scenarios.
Downstream Impacts	Downstream impacts refer to conditions in the Ohio River below Jefferson County. Nutrient loadings in the Ohio (not just Jefferson County) have been identified as the source of 30 - 45% of the total nutrient loads reaching the Gulf of Mexico. BOD is not likely to persist in the river long enough to get to the Gulf, but can have detrimental impacts far downriver.	Pollutant removals will be estimated based on reductions in annual average loads, since the downstream impacts are primarily long-term and cumulative.
Stream Flow Impacts (Peak flows)	Excessively high pass flows as are often caused by urbanization of a watershed can erode the stream bed, damage aquatic and terrestrial habitat, make water based recreation unsafe or impractical.	Predictive models can estimate flow peaking factors from individual sources, and the Water Quality Tool has a hydraulic component to estimate stream flows during various storm events.
Stream Flow Impacts (DWF only)	Diversion of flows away from a stream due to abandonment of a treatment plant etc. can reduce base flows in a stream. Alternatively, other control measures such as groundwater pumping can increase base flows with beneficial results.	Predictive models can estimate flows from individual sources, and the Water Quality Tool has a hydraulic component to estimate stream flows during various dry weather events.

Note: The total score calculated may be more than 25. In the instances where this might occur, a default maximum score of 25 will be calculated.

Acronyms
BGC - Beargrass Creek
BOD - Biological oxygen demand
CSO - Combined sewer overflow
DO - Dissolved oxygen
DWF - Dry weather flow
mg/l - Milligram per liter
SAT - Solids and floatables

S_MI_MF_NB06_09_C														
Value:	**Eco-Friendly Solutions**													
	Scoring													
Aspect	-5	-4	-3	-2	-1	0	1	2	3	4	5	Assumptions	Score Per Aspect	
Non-Renewable Energy Consumption	Primary energy consumption is greater than secondary treatment	Primary energy consumption equal to 75 - 100% of secondary treatment	Primary energy consumption equal to 50 - 75% of secondary treatment	Primary energy consumption equal to 15 - 50% of secondary treatment	Primary energy consumption equal to 0 - 15% of secondary treatment	No energy consumption except for cleaning and maintenance	Cleaning and maintenance not needed, no primary consumption	NA	NA	NA	NA	Pumps will use energy	-1	
Use of Natural Systems	Constructed facilities permanently displace 5+ acres wetlands or 50% locally available green space	Constructed facilities permanently displace 3 - 5 acres wetlands or 25 - 50% locally available green space	Constructed facilities permanently displace 1 - 3 acres wetlands or 10 - 15% locally available green space	Constructed facilities permanently displace 0 - 1 acre wetlands or up to 10% locally available green space	Constructed facilities temporarily disrupt wetlands or green space	Alternative does not use or affect natural systems, wetlands, or green space	Alternative doesn not use natural systems, but enhances green space or wetland	Natural systems play a minor role in alternative function, up to 1 acre wetland or 10% additional green space created	Natural systems are significant part of alternative function, 1 - 3 acres of wetland created or 10 - 25% additional green space	Alternative fully uses natural systems, 3 - 5 acres of wetland created or 25-50% additional green space	Alternative results in multi-use natural system development, 5+ acres of wetland or 50% additional green space		0	
Multiple-Use Facilities	Constructed facilities permanently eliminate recreational opportunity	Constructed facilities significantly impare recreational opportunity	Constructed facilities moderately impare recreational opportunity	Constructed facilities have minor impacts on recreational opportunity	Construction temporarily impacts recreational opportunity	No impacts on recreational opportunities	Alternative improves access to existing recreational areas	Alternative has limited positive impact on recreation	Alternative significantly enhances recreational opportunities	Alternative increases recreational opportunities in area	Alternative results in multi-use facility		0	
Source Control of subwatershed pollutant loads	Pollutant loadings are increased by 50%	Pollutant loadings are increased by 30 - 50%	Pollutant loadings are increased by 10 - 30%	End of pipe pollutant loadings are increased by 0 - 10%	End of pipe pollutant loadings impacts are inconsistent, but likely higher	End of pipe pollutant loadings are unchanged	Pollutant loadings impacts are inconsistent, but likely lower	Source control reduces pollutant loadings by 0 - 10%	Source control reduces pollutant loadings by 10 - 30%	Source control reduces pollutant loadings by 30 - 50%	Source control reduces pollutant loadings by more than 50%		0	
Non-Obtrusive Construction Techniques	Permanent loss of green space or sensitive area disruption	Main thoroughfare closures, sensitive area temporary disruptions	Widespread dust and noise, blasting, secondary street closures	Localized dust, noise and local street closures	Minor dust and noise, traffic lane closures	No construction impacts	NA	NA	NA	NA	NA		0	
Consistent Land Use	Intrusive or nuisance facilities inconsistent with neighborhood or land use.	Facilities inconsistent with neighborhood or land use.	Facility characteristics mitigated to reduce impact on neighborhood	Facilities have significant impact on development density or land use	Facility has minor impact on development density or land use	No impact on land use or no above ground facilities	Alternative mitigates existing compatibility problem	Alternative removes facility inconsistent with neighborhood	Alternative removes nuisance facility from neighborhood	Alternative enhances property values in neighborhood	Alternative provides enhancements that significantly improve neighborhood		0	
Impermeable Surfaces	5 acres+ of impermeable surfaces are added	3 - 5 acres of impermeable surfaces are added	1 - 3 acres of impermeable surfaces are added	up to 1 acre of impermeable surfaces are added	Minor increase in impermeable surfaces added	No change in impermeable surface	Minor reduction in impermeable surfaces	Up to 1 acre of impermeable surfaces removed	1 - 3 acres of impermeable surfaces removed	3 - 5 acres of impermeable surfaces removed	More than 5 acres of impermeable surfaces removed		0	
LEEDS Performance	NA	NA	NA	NA	NA	LEEDS not applicable or LEEDS score <10	LEEDS Score 10 - 25	LEEDS Certified	LEEDS Silver	LEEDS Gold	LEEDS Platinum		0	

Instructions: (1.) Score each alternative for each of the eight aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "fatal flaw". Alternatives that score in this area should not be proposed.

Total Raw Score Calculated	-1
Total Score (Default)	-1

Note: The total score calculated may be more than 25. In the instances where this might occur, a default maximum score of 25 will be calculated.

Aspect	Rationale	Measurement Method
Non-Renewable Energy Consumption	Eco-friendly solutions would be expected to be low consumers of non-renewable energy. Benchmarking energy consumption against conventional secondary treatment provides penalty points for high energy consuming alternatives.	Evaluation of primary energy consumed per MG of flow treated, compared to the energy consumed at the WCWTP per MG treated.
Use of Natural Systems	Natural systems replace concrete and steel construction with wet bottom storage lagoons, constructed bioswales, rain gardens etc. that increase green space of various kinds. Options that reduce wetlands and green space get penalty points.	Acres of wetlands and other types of green space created or eliminated. Also includes subjective evaluation of the "basis" of the alternative - "green" or "grey".
Multiple-Use Facilities	Eco-friendly solutions create recreational opportunities for both water-based and riparian recreation. Boating, canoeing, kayaking, fishing, wading, swimming etc. would be direct water based recreation. Bird watching, hiking, biking, picnicing, camping etc. would be considered related riparian recreation.	Subjective evaluation of changes predicted in the aquatic or riparian environment as a result of better water quality, increased base flow or decreased flow peaks, increased tree cover or vegetated riparian areas etc.
Source Control of subwatershed pollutant loads	Controlling pollutant loads at the source through behavior modification, product replacements or stormwater management BMPs that capture pollutants thereby avoiding end of pipe treatment requirements.	Modeled land side pollutant loading reductions as calculated by the BGC Water Quality Tool or by comparison to literature values or pilot program measurements.
Non-Obtrusive Construction Techniques	Probable construction impacts on traffic, noise and dust are all measures of the friendliness of an alternative. Construction impacts get penalty points for creating nuisance conditions.	Subjective evaluation of probable construction impacts based on the type of construction envisioned for the alternative.
Consistent Land Use	Alternative configuration can either enhance or detract from the surrounding property. For example, an extremely unfriendly pump station can be noisy, smelly, and ugly. The same pump station can be "disguised" as a residence that fits right in with the neighborhood. If a larger parcel of land is available, a pump station can be hidden from view by landscaping, and a community garden or other green space added to enhance the neighborhood.	At the planning level, projects can be defined to avoid negative impacts on the surrounding properties. Depending on the availability of land, enhancements are possible. This aspect encourages project definition and budgets to enhance, not detract.
Impermeable Surfaces	Adding impermeable surfaces increases total runoff volume, peak runoff flowrates, and the total transport of any pollutant deposited on the surface from any source. Conversely, permeable surfaces can reduce flow volume and peaks, and provide filtering mechanisms for pollutants.	Acres of permeable surfaces created or eliminated.
LEEDS Performance	LEED standards are applicable to alternatives that include above-ground building structures.	Application of LEED evaluation points.

Acronyms
BGC - Bisargrass Creek
LEEDS - Leadership in Energy and Environmental Design
MG - million gallons
WCWTP - West County Wastewater Treatment Plant

MSD
Louisville / Jefferson County Metropolitan Sewer District

SSO SSDP
Modeled Solutions
Project Fact Sheet

PROJECT WIN
Waterway Improvements Now

SSO Project Number: S_MI_MF_NB06_03_C

Modeled Area: Middle Fork

Branch or SSO ID: MF06

Project Type: Pump Station

Receiving Stream: Middle Fork

Project Description: This alternative includes the following : upsize PS at 01106, upsize PS at 00746 and replace FM with a 6 inch FM, upsize Pump Station at MSD0057, replace combined section of force main with 8 inch, and replace downstream 8 inch collector with 10 inch.

Reason for Overflow: Bypass Pipe at Vannah Way. Undersized Pumps at Anchor Estates # 1 and # 2.

Design Parameters / Assumptions: This solution is based on a 2 year - 3 hour rain event

Project Constraints: None at this time

Estimated Capital Cost (2010 dollars): $9,060,753

Weighted Benefit/Cost Ratio (Capital Cost): 5.34

Overflow Points Addressed:

SSO	SSO Name	Service Area	Overflow Type	Discharge To	Average Overflow / Incident (gallons)	Number of Overflow/ Yr
00746	Anchor Estates # 1 PS	Morris Forman	Pumped	Ditch	8,023	27.6
MSD0057	Anchor Estates # 2 PS	Morris Forman	Capacity	Stream	9,183	31.0
01106	Foxboro Dr / End of St PS	Morris Forman	Bypass	Catchbasin	No Data	1.7

MSD

Project Cost Summary Sheet

Project ID: S_MI_MF_NB06_M_03_C

Description: Upsize PS at 01106; Upsize PS at 00746 and Replace FM with 6" FM; Upsize Pump Station at MSD0057; replace combined section of force main with 8"; replace downstream 8" collector with 10"

Estimate Date: 5/16/2008

Prepared By: Bill Sanders, P.E. Heritage Engineering

Printed Date: 6/18/2008

Cost Estimate Description		Totals
Estimated Open Cut Sewer Construction Cost	$	1,205,000
Estimated Tunneling Construction Cost	$	-
Estimated Off-line Storage Facilities Construction Cost	$	-
Estimated I/I Removal Cost	$	-
Estimated Pump Station Cost	$	2,998,000
Estimated Flow Control Structure	$	-
Estimated Earthen Basin Cost	$	-
Estimated Force Main Cost	$	341,000
Estimated High Rate Treatment Cost	$	-
Estimated Screening Cost	$	-
Misc. Extra Cost Description:	$	-
Total Estimated Construction Cost =	**$**	**4,544,000**

Real Estate Costs Description			Totals
Easement Cost	# of Properties =	0	$ -
Property Acquisition			$ -
Misc. Extra Cost Description:			$ -
Total Additional Costs =			**$ -**

Multipliers Description	Multiplier
Administration Costs	4%
Contingencies	25%
Interest	6%
Miscellaneous	9%
Engineering & Inspection	8%
Design Services	5%
Program Management	4%
Planning & Preliminary Design	2%
Performance Bond	1%
Total Multipliers =	**64%**

Data File Base ENRCCI	7312	**PROJECT CAPITAL COST ESTIMATE =**	$ 7,452,000
Data File ENRCCI in use	7888	**Project 20 Year Present Worth Estimate =**	$ 7,303,000

For Economy of Scale when dealing with the facility worksheets for a facility whose size is far greater than the largest available on the curve use the following Economy of Scale equation to adjust the cost and enter the adjustment in the Misc. Extra Cost: (Professional Engineering judgement to be used for decision to use this adjustment.)

$$C = Cr (Qc / Qr) ^ m$$

Cr = cost from tool at maximum size for facility cost curve

Qc = design size

Qr = maximum size for facility from cost curve

C = cost for design size Qc

m = correlation exponent (0 < m < 1) Use 0.6 for all structures.

EXAMPLE: For a BF facility of 500 MGD where 100 is the maximum size on the curve use:

C = $41,686,164 * (500 / 100) ^ 0.6	=	$	109,489,869
C500 from Tool	=	$	208,281,000
Difference (C - C500)	=	**$**	**(98,791,131)**

Enter the Difference as a negative value in the Misc. Extra Cost row and enter in Economy of Scale Adjustment in the Description.

Benefit/Cost Model Cost Data		
Capital Cost	$	9,060,753
Total Present Worth	$	7,915,904

MSD

ENRCCI overwrite by Estimator: 8550

PROJECT CAPITAL COST ESTIMATE =	$	8,077,409
Project 20 Year Present Worth Estimate =	$	7,915,904
Construction Cost Estimate =	$	4,925,355

Project Values Summary Sheet

Value Description	Totals
Length of Open Cut Sewer Conveyance (Feet)	2,300
Length of Tunnel Sewer Conveyance (Feet)	0
Off-line Storage Annual Volume Stored (Million Gallons)	0
Off-line Storage Estimated # of Annual Occurrence	0
Flow Control Structure Annual Volume Stored (Million Gallons)	0
Flow Control Structure Estimated # of Annual Occurrence	0
Earthen Basin Annual Volume Stored (Million Gallons)	0
Earthen Basin Estimated # of Annual Occurrence	0
Annual Volume of Pumping (Million Gallons)	372
Estimated Total Dynamic Head of Pumping (Feet)	115
Length of Force Main Conveyance (Feet)	2,300
Annual Volume of High Rate Treatment (Million Gallons)	0
High Rate Treatment Estimated # of Annual Occurrences	0
Screening Estimated # of Annual Occurrences	0
Screening Annual Volume Disinfected	0

MSD

OPEN CUT SEWER CONSTRUCTION VALUE ENTRY SHEET

Project ID: *S_MI_MF_NB06_M_03_C*

Estimate Date: 5/16/2008

Printed Date: 6/18/2008

Prepared By: Bill Sanders, P.E. Heritage Enginee

Segment ID	*Pipe Size (in)	Length of Pipe in Street (ft)	Length of Pipe out of Street (ft)	**Average Depth (ft)	# of San. Service Laterals	# of Aband'd Inlets	# of New Inlets	# of Water Services Replaced	Street Width (ft)	# of Manholes	# of Diversion Structures	# of Existing MH Surface Rehabs	Small Medium or Large Creek Crossing (S,M, or L)	Sewer in Rock	Dewatering Required	Maintenance of Flow	Brownfields	Clearing and Grubbing	Traffic Maintenance Required	Urban Alignment	Total Cost Per Segment
D/S	10	2,300	0	6	32	0	0	9	22	6	0	0		x		x			x		$ 1,022,662
																					$ -
																					$ -
																					$ -
																					$ -
																					$ -
																					$ -
																					$ -
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -
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-	0	0	0	0	0	0	0	0	0	0	0	0									$ -
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -

2,300 = **Total Length of Open Cut Job**

2,300 = **Total Length of Sanitary Sewer in Rock**

Total Cost for Construction = $ 1,022,662

Small Job Multiplier = 18%

Estimated Total Sewer Construction Cost = $ 1,205,012

* - Use standard pipe sizes with maximum pipe size of 144 inches

** - Minimum depth is 5 feet. For depths that are greater than 25 feet use Tunneling worksheet

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PUMP STATIONS VALUE ENTRY SHEET

Project ID: ***S_MI_MF_NB06_M_03_C***

Estimate Date: 5/16/2008

Printed Date: 6/18/2008

Prepared By: Bill Sanders, P.E. Heritage Engineerir

Facility ID	**Estimated Depth (ft)	Estimated Total Head (ft)	*Estimated Peak Flow Rate (MGD)	***In Rock	Odor Control	Grinders Required	Add Grit Pit	Dewatering Required	Brownfields	Exclude Structure (-%)	Total Cost Per Facility
01106	0	20	0.02			x				-60%	$ 42,038
MSD0057	13	40	0.5	x	x			x		0%	$ 1,460,997
00746	13	55	0.5	x	x	x		x		0%	$ 1,495,191
D	0	0	0							0%	$ -
E	0	0	0							0%	$ -

Enter Description if Exclude Structure -% used:

01106 will re-use wet well. Some Control modifications may be required

Estimated Total Pump Station Construction Cost = $ 2,998,227

* - Pump station cost curve limits out at 200 MGD. If over 200 MGD use multiple pump stations and do not check box any extras or reenter the same depth.

** - Cost per linear foot increases at depths of 20, 50, 100 and 150 feet.

*** - Being in rock is beneficial at depths greater than 50 feet. In Rock should not be checked at these depths.

MSD

FORCE MAIN CONSTRUCTION VALUE ENTRY SHEET

Project ID: *S_MI_MF_NB06_M_03_C*

Prepared By: Bill Sanders, P.E. Heritage Engineering

Estimate Date: 5/16/2008

Printed Date: 6/18/2008

Segment ID	*Pipe Size (in)	Length of Pipe in Street (ft)	Length of Pipe out of Street (ft)	Average Depth (ft)	# of Utility crossings	Street Width (ft)	# of Manholes	# of Air Release Valves	Small Medium or Large Creek Crossing (S,M, or L)	In Rock	Dewatering Required	Brownfields	Clearing and Grubbing	Traffic Maintenance Required		Total Cost Per Segment
After Combo	8	400	0	5	2	22	0	1								$ 73,200
After Combo	8	0	400	5	0	0	0	1								$ 35,825
00746	6	1,500	0	5	3	16	0	2								$ 232,313
D	0	0	0	0	0	0	0	0								$ -
E	0	0	0	0	0	0	0	0								$ -
F	0	0	0	0	0	0	0	0								$ -
G	0	0	0	0	0	0	0	0								$ -
H	0	0	0	0	0	0	0	0								$ -
I	0	0	0	0	0	0	0	0								$ -
J	0	0	0	0	0	0	0	0								$ -
K	0	0	0	0	0	0	0	0								$ -
L	0	0	0	0	0	0	0	0								$ -
M	0	0	0	0	0	0	0	0								$ -
N	0	0	0	0	0	0	0	0								$ -
O	0	0	0	0	0	0	0	0								$ -
P	0	0	0	0	0	0	0	0								$ -
Q	0	0	0	0	0	0	0	0								$ -
R	0	0	0	0	0	0	0	0								$ -
S	0	0	0	0	0	0	0	0								$ -
T	0	0	0	0	0	0	0	0								$ -
U	0	0	0	0	0	0	0	0								$ -
V	0	0	0	0	0	0	0	0								$ -
W	0	0	0	0	0	0	0	0								$ -
X	0	0	0	0	0	0	0	0								$ -
Y	0	0	0	0	0	0	0	0								$ -

*Note - pipe sizes range from 6" to 54". If a larger forcemain may be required it is recommended that the estimator cost out dual forcemains of smaller diameter.

2,300 = **Total Length of Force Main**

Estimated Total Force Main Construction Cost = $ 341,338

Cluster Comparison

S_MI_MF_NB06_03_C Upgrade PS at 01106, 00746, and MSD 0057 and upsize force mains and d/s collector

CSO/SSO ID[5]		Raw Benefit Score[2,4] Regulatory Performance	Public Health	Asset Protection	Environmental Enhance	Eco-Friendly Solutions
01106		12	0	0	2	-3
00746		21	10	0	2	-3
MSD0057		12	3	0	2	-3
000		0	0	0	0	0
000		0	0	0	0	0
000		0	0	0	0	0
000		0	0	0	0	0
000		0	0	0	0	0
Weighting Factor		8	10	6	8	6
Weighted Benefit Score		360	130	0	48	-54
Total Benefit Score	484					
Total Capital Cost[3]	$9,009,000					
Total Present Worth Costs[3]	$7,878,000					
Weighted Benefit/Cost Ratio (Capital Costs)	5.37					
Weighted Benefit/Cost Ratio (Total Present Worth Costs)	6.14					

Notes:

1. Data Input Cells are highlighted in yellow
2. Raw Benefit Scores for Regulatory Performance and Public Health values are from the CSO or SSO Level of Control Benefit Sheets
3. Capital and Total Present Worth Costs from the"Proj Summary" Page of the Cost Model for the clustered alternative
4. Formulas are referenced based on existing template layout, if template is changed make sure to double check referenced cells highlighted in gray
5. Use treatment plant name as ID for CSO/SSO projects that require improvements to the treatment plant

2-Year	Network Branch #6										
Value:	**Regulatory Performance - SS0s**										
	Measure	**Impact / Frequency**						**Rationale**	**Measurement Method**		
Performance Measure	**SSOs**	**6 month**	**1 Year**	**2 Year**	**5 Year**	**10 Year**	**Modeled Overflow Point or No discharge**	Regulations do not distinguish between potential impact of SSOs, therefore frequency and impact are the same for Regulatory Performance value.. Modeled Overflow Points are not considered until verified.	Measurement methods will be via hydraulic models to quantify the SSO discharge.		
Frequency	**Value**	25	16	9	4	1	0		Base	Prop	
	01106		BL		PR				16	4	12
	00746	BL			PR				25	4	21
	MSD0057-LS		BL		PR				16	4	12
Note - This value sheet calculates the total benefit.									**Subtotal**		**45**

Acronyms
AAOV - Average annual overflow volume
CSO - Combined sewer overflow
WQS - Water quality standards
WWTPs - Wastewater treatment plants
BL - Baseline
PR - Proposed

01106 - 2 YR	Network Branch #6										
Value:	**Public Health Enhancement - SSOs**										
	Measure	**Release Impact**						**Rationale**	**Measurement Method**		
Performance Measures	**SSOs**	**Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals**	**Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals**	**Release 50,000 - 99,999 Gals**	**Release 20,000-49,999 Gals**	**Release 10,000 - 19,999 Gals**	**No discharge**	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	**6 Month**	25	20	15	10	5	0		0	0	0
	1 Year	20	16	12	8	4	0	1,000 GL BL	0	0	0
	2 Year	15	12	9	6	3	0	2,000 GL BL	0	0	0
	5 Year	10	8	6	4	2	0	5,000 GL BL	0	0	0
	10 Year	5	4	3	2	1	0	8,000 GL BL	0	0	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								**Average Total Score**			0
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system BL - Baseline GL - Gallons								**Corrected Score**			0

00746 - 2 YR	Network Branch #6										
Value:	**Public Health Enhancement - SSOs**										
	Measure	**Release Impact**						**Rationale**	**Measurement Method**		
Performance Measures	**SSOs**	**Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals**	**Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals**	**Release 50,000 - 99,999 Gals**	**Release 20,000-49,999 Gals**	**Release 10,000 - 19,999 Gals**	**No discharge**	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	**6 Month**	25	20	15	10	5	0	10,000 Gal BL	5	0	5
	1 Year	20	16	12	8	4	0	30,000 Gal BL	8	0	8
	2 Year	15	12	9	6	3	0	60,000 Gal BL	12	0	12
	5 Year	10	8	6	4	2	0	100,000 GL BL	8	4	4
	10 Year	5	4	3	2	1	0	150,000 GL BL	4	4	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								**Average Total Score**			6
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system BL - Baseline GL - Gallons								**Corrected Score**			10

MSD0057-LS - 2 YR Network Branch #6											
Value:	Public Health Enhancement - SSOs										
	Measure	Release Impact						Rationale	Measurement Method		
Performance Measures	SSOs	Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals	Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals	Release 50,000 - 99,999 Gals	Release 20,000-49,999 Gals	Release 10,000 - 19,999 Gals	No discharge	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	6 Month	25	20	15	10	5	0		0	0	0
	1 Year	20	16	12	8	4	0	6,000 GL - BL	0	0	0
	2 Year	15	12	9	6	3	0	25,000 GL - BL	6	0	6
	5 Year	10	8	6	4	2	0	60,000 GL - BL	8	6	2
	10 Year	5	4	3	2	1	0	100,000 GL - BL	4	4	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								Average Total Score			2
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system BL - Baseline GL - Gallons								Corrected Score			3

S_MI_MF_NB06_03_C														
Value:	**Asset Protection**													
	Measure			**Impact**						**Rationale**	**Measurement Method**			
Performance Measures		Flood Damage		Homes or businesses are subject to severe structural damage	Homes or businesses are subject to minor to moderate structural damage	Flooding limits access to homes or businesses	Flooding limits access to recreational areas	Standing water on property, but access not affected and no damage expected	No standing water	Stormwater BMPs can reduce stormwater peaks and reduce extent of flooded areas, while sewer separation may increase localized stormwater peak flows and increase the flooding impacts of storms. Alternatively, purchase of highly impacted properties may be a cheaper way to reduce flood damage and create green space and buffer zones.	Drainage models where available, historic customer complaints from MSD Customer Information System, or historic observations of flood-prone areas combined with the expected relative impacts of sewer system modifications on storm water flows.			
		Basement Back-ups		Sewer surcharging within 6 feet of ground surface for more than 20% of manholes	Sewer surcharging within 6 feet of ground surface for 10 - 20% of manholes	Sewer surcharging within 6 feet of ground surface for 5 - 10% of manholes	Sewer surcharging within 6 feet of ground surface for 1 - 5% of manholes	Sewer surcharging within 6 feet of ground surface for 0 - 1% of manholes	No surcharging within 6 feet of ground surface	First floor levels are typically 1 - 2 feet above ground surface, and basement floors are typically 8 - 10 feet below the first floor. A sewer surcharge of 6 feet below ground surface is highly likely to cause back-ups in homes with basement service.	Measurement methods will be via hydraulic models to quantify the hydraulic grade lines compared to ground surface elevations at manholes.			
	Storm Events			Most Severe Impact				Least Impact	No Impact					
				5	4	3	2	1	0	**Assumptions**	**Base Case Score**	**Alternative Score**	**Total Score**	
Frequency	6 Month	Most Likely	5	25	20	15	10	5	0		10	10	0	
	1 Year		4	20	16	12	8	4	0		8	8	0	
	2 Year		3	15	12	9	6	3	0		6	6	0	
	5 Year		2	10	8	6	4	2	0		4	4	0	
	10 Year	Least Likely	1	5	4	3	2	1	0		3	3	0	
	Not Possible	Not Possible	0	0	0	0	0	0	0	**Average**			0	
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.										**Total Score**			0	

Acronyms
BMPs - Best management practices

S_MI_MF_NB06_03_C													
Value:	Environmental Enhancement												
	Scoring												
Aspect	-3	-2	-1	0	1	2	3	4	5	6	7	Assumptions	Score this Aspect
Aquatic and Terrestrial Habitat Protection	Extirpation of habitat for rare or endangered species	Extirpation of significant amount of common habitat	Elimination of minor amount of common habitat	Significant habitat impairment	Some improvement in existing habitat	No impact on habitat	Minor enhancement of existing habitat	Significant enhancement of existing habitat	Creation of minor amount of common habitat	Creation of significant amount of common habitat	Creation of critical habitat for rare or endangered species		
Aesthetics - Solids and Floatables	75%+ reduction in volume of flow with no SAT applied	50 - 75% of flow with no SAT removal	25 - 50% of flow with no SAT removal	0 - 25% of flow with no SAT removal	Reduces efficiency of the small SAT basins (basins 1 - 12) in low wet-weather SAT periods	No change in SAT removal	1 - 10% of the budget flow treated with positive SAT removal (basins)	10 - 21% of the budget flow treated with positive SAT removal (basins)	21 - 50% of the budget flow treated with positive SAT removal (basins)	50 - 75% of the budget flow treated with positive SAT removal (basins)	75% + of the budget flow treated with positive SAT removal (basins)		
Aesthetics - Odor and Air Emissions	Severe annoying odor source affecting > 20 customers (no odor controls)	Severe annoying odor source affecting > 20 customers (odor controls)	Severe annoying odor source affecting <20 customers (odor controls)	Could detectable odor source (during 1 % customers (no	Could generate odor source affecting > 10 customers (unconfirmed)	No impact on odor	Eliminate detectable odor source affecting > 10 customers (unconfirmed)	Eliminate detectable odor source affecting > 10 customers (confirmed)	Eliminate annoying odor source affecting >20 customers (unconfirmed)	Eliminate annoying odor sources affecting >20 customers after implementation	Eliminate annoying odor source affecting >20 customers after		
Dissolved Oxygen Impacts	Reduction of in stream DO to 0 mg/l during critical	Continuous reduction in in stream DO of 1 mg/l	Early onset reduction of in stream DO of 0 - 1 mg/l possible reduction of in stream DO 0 - 2 mg/l during critical conditions	Intermittent reductions in in stream DO 0 mg/l - possible during non-critical conditions reduction of DO 0 - 2 mg/l during critical conditions	Intermittent reduction of in stream DO 0 - 2 mg/l possible during non-critical conditions	No DO impact	Intermittent improvement of in stream DO 0 - 2 mg/l	Intermittent improvement of in stream DO 0 - 2 mg/l minimum annual operation improvement 1 - 3 mg/l	Continuous improvement of in stream DO 0 - 2 mg/l minimum annual operation improvement 2 - 4 mg/l	Continuous improvement of in stream DO 0 - 2 mg/l	Continuous improvement of in stream DO 2 mg/l	Continuous improvement of stream DO 2 mg/l	
Downstream Impacts	75%+ increase in annual BOD or nutrient loads	50 - 75% increase in annual BOD or nutrient loads	25 - 50% increase in annual BOD or nutrient loads	10 - 25% increase in annual BOD or nutrient loads (COD - 1 mg/l)	Potential 5 - 10% increase in annual average BOD or nutrient loads (COD - 1 mg/l)	No impact on BOD or nutrient loads (COD - 1 mg/l)	5 - 10% reduction in annual BOD or nutrient loads (COD - 1 mg/l)	10 - 25% reduction in annual BOD or nutrient loads (COD - 1 mg/l)	25 - 50% reduction in annual BOD or nutrient loads (COD - 1 mg/l)	50 - 75% reduction in annual BOD or nutrient loads (COD - 1 mg/l)	75% + reduction in annual BOD or nutrient loads (COD - 1 mg/l)		
Stream Flow Impacts (Peak flows)	50% + increase in peak flows	40% - 50% increase in peak flows	30 to 40% increase in peak flows	Frequent increase of flow during critical conditions	Possible increase in average flow or minor increase in high flow years	No impact on peak flows	Minor reduction in flow, no significant peak reduction	Minor reduction in peak flows under some conditions	Up to 10% reduction in peak flows	10% - 21% reduction in peak flows	21% + reduction in peak flows		
Stream Flow Impacts (DWF only)	25%+ decrease in flow during critical conditions	10% - 25% decrease in flow during critical conditions	0 -10% permanent decrease in flow during critical conditions	Frequent decrease in flow during critical conditions	Possible decrease in average flow	No impact on average or base stream flow	Intermittent increase in stream flow - not linked to critical conditions	Intermittent increase in stream flow - often improves critical conditions	0 - 10% permanent increase in stream flow during critical conditions	10 - 25% + permanent increase in stream flow during critical conditions	25%+ permanent increase in stream flow during critical conditions		
Instructions: (1.) Score each alternative for each of the seven aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "total flow". Alternatives that score in this area should not be proposed.										Total Raw Score Calculated			5
										Total Score (Default)			2

Aspect	Rationale	Measurement Method
Aquatic and Terrestrial Habitat Protection	Wet weather projects may affect both aquatic and terrestrial habitat through changes in base flow, peak flow, water quality, tree cover, channel shape and characteristics, etc. Predictive models used to evaluate wet weather control measures have a limited ability to predict biological diversity changes. Erosion impacts etc., so surrogate metrics must be used to estimate future positive and negative impacts	Project definition may specifically address changes in channel shape and configuration, tree cover etc. Predictive models will address DO and other water quality impacts. Flow models will predict base flow and peak flow rates to allow estimates of changes in erosion and water surface elev
Aesthetics - Solids and Floatables	Most CSOs have some form of solids and floatables control baffles. Improvements in capture rates can be expected with screening or other advanced treatment options. Storm water retention, constructed wetlands, and other control systems may provide solids and floatables removal as well. While reduction in solids and floatables removal efficiency is not likely, penalty points will be assessed if this is possible with any alternative	Current solids and floatables removal efficiency has been estimated for all sites with control technology. Improvements in removal efficiencies will be estimated for all alternatives that add screening or other advanced treatment technologies. Where treatment is proposed for storm water discharges removals will be estimated based on published removal data
Aesthetics - Odor and Air Emissions	Odors and air emissions can be generated in storage systems, pump stations, force mains, and long flat sewers. Odors are generally characterized by both the intensity and the quality of the odor. Detectable and annoying are two common descriptors of different intensities and qualities of odors from sewage handling facilities	Odor emissions from sewage handling facilities can be modeled by intensity, quality, and geographic spread. For planning purposes this level of evaluation is not common, and will not be done except in very rare circumstances. The potential for odor and air emissions will be estimated based on type of applications and model predictions for storage time, number of events, average flow velocities etc.
Dissolved Oxygen Impacts	Dissolved oxygen in streams is dependent on a variety of factors including BOD load, nutrient load, stream flow velocity, water temperature, etc.	For BGC the Water Quality Tool will be used to estimate the impacts of various loading conditions, flows, temperatures, etc. Probable impacts of individual projects will be estimated based on comparisons to the various stream condition scenarios
Downstream Impacts	Downstream impacts refer to conditions in the Ohio River below Jefferson County. Nutrient loadings in the Ohio (not just Jefferson County) have been identified as the source of 30 - 45% of the total nutrient loads reaching the Gulf of Mexico. BOD is not likely to persist in the river long enough to get to the Gulf, but can have detrimental impacts far downriver	Pollutant removals will be estimated based on reductions in annual average loads, since the downstream impacts are primarily long-term and cumulative
Stream Flow Impacts (Peak flows)	Extremely high peak flows as are often caused by urbanization of a watershed can erode the streambed, damage aquatic and terrestrial habitat, make water based recreation unsafe or impractical	Predictive models can estimate flow passing factors from individual sources and the Water Quality Tool has a hydraulic component to estimate stream flows during various storm events.
Stream Flow Impacts (DWF only)	Diversion of flows away from a stream due to abandonment of a treatment plant etc. can reduce base flows in a stream. Alternatively, other control measures such as groundwater pumping can increase base flows with beneficial results	Predictive models can estimate flows from individual sources, and the Water Quality Tool has a hydraulic component to estimate stream flows during various dry weather events

Note: The total score calculated may be more than 25. In the instances where this might occur, a default maximum score of 25 will be calculated.

Acronyms
BGC - Bluegrass Creek
BOD - Biological oxygen demand
CSO - Combined sewer overflow
DO - Dissolved oxygen
DWF - Dry weather flow
mg/l - Milligram per liter
S&F - Solids and floatables

MSD

S_MI_MF_NB06_03_C

Value: Eco-Friendly Solutions

Aspect	Scoring -5	-4	-3	-2	-1	0	1	2	3	4	5	Assumptions	Score Per Aspect
Non-Renewable Energy Consumption	Primary energy consumption is greater than secondary treatment	Primary energy consumption equal to 75 - 100% of secondary treatment	Primary energy consumption equal to 50 - 75% of secondary treatment	Primary energy consumption equal to 15 - 30% of secondary treatment	Primary energy consumption equal to 0 - 15% of secondary treatment	No energy consumption except for cleaning and maintenance	Cleaning and maintenance not needed, no primary consumption	NA	NA	NA	NA	Pumps will use energy	-1
Use of Natural Systems	Constructed facilities permanently displace 5+ acres wetlands or 30% locally available green space	Constructed facilities permanently displace 3 - 5 acres wetlands or 25 - 30% locally available green space	Constructed facilities permanently displace 1 - 3 acres wetlands or 10 - 15% locally available green space	Constructed facilities permanently displace 0 - 1 acre wetlands or up to 10% locally available green space	Construction facilities temporarily disrupt wetlands or green space	Alternative does not use or affect natural systems, wetlands or green space	Alternative doesn not use natural systems, but enhances green space or wetland	Natural systems play a minor role in alternative function, up to 1 acre wetland or 10% additional green space created	Natural systems are significant part of alternative function, 1 - 3 acres of wetland created or 10 - 25% additional green space	Alternative fully uses Natural systems, 3 - 5 acres of wetland created or 25-50% additional green space	Alternative results in multi-use natural system development, 5+ acres of wetland or 50% additional green space		0
Multiple-Use Facilities	Constructed facilities permanently eliminate recreational opportunity	Constructed facilities significantly impare recreational opportunity	Constructed facilities moderately impare recreational opportunity	Constructed facilities have minor impacts on recreational opportunity	Construction temporarily impacts recreational opportunity	No impacts on recreational opportunities	Alternative improves access to existing recreational areas	Alternative has limited positive impact on recreation	Alternative significantly enhances recreational opportunities	Alternative increases recreational opportunities in area	Alternative results in multi-use facility		0
Source Control of subwatershed pollutant loads	Pollutant loadings are increased by 50%	Pollutant loadings are increased by 30 - 50%	Pollutant loadings are increased by 10 - 30%	End of pipe pollutant loadings are increased by 0 - 10%	End of pipe pollutant loadings are increased, but likely higher	End of pipe pollutant loadings are unchanged	Pollutant loadings impacts are inconsistent, but likely lower	Source control reduces pollutant loadings by 0 - 10%	Source control reduces pollutant loadings by 10 - 30%	Source control reduces pollutant loadings by 30 - 50%	Source control reduces pollutant loadings by more than 50%		0
Non-Obtrusive Construction Techniques	Permanent loss of green space or sensitive area disruption	Main thoroughfare closures, sensitive area temporary disruptions	Widespread dust and noise, blasting, secondary street closures	Localized dust, noise and local street closures	Minor dust and noise, traffic lane closures	No construction impacts	NA	NA	NA	NA	NA	Duration on neighborhood streets	2
Consistent Land Use	Intrusive or nuisance facilities inconsistent with neighborhood or land use	Facilities inconsistent with neighborhood or land use	Facility characteristics mitigated to reduce impact on neighborhood	Facilities have significant impact on development density or land use	Facility has minor impact on development density or land use	No impact on land use or no above ground facilities	Alternative mitigates existing compatibility problem	Alternative removes facility inconsistent with neighborhood	Alternative removes nuisance facility from neighborhood	Alternative enhances property values in neighborhood	Alternative provides enhancements that significantly improve neighborhood		0
Impermeable Surfaces	5 acres+ of impermeable surfaces are added	3 - 5 acres of impermeable surfaces are added	1 - 3 acres of impermeable surfaces are added	up to 1 acre of impermeable surfaces are added	Minor increase in impermeable surfaces added	No change in impermeable surface	Minor reduction in impermeable surfaces	Up to 1 acre of impermeable surfaces removed	1 - 3 acres of impermeable surfaces removed	3 - 5 acres of impermeable surfaces removed	More than 5 acres of impermeable surfaces removed		0
LEEDS Performance	NA	NA	NA	NA	NA	**LEEDS** not applicable or LEEDS score <10	LEEDS Score 10 - 25	LEEDS Certified	LEEDS Silver	LEEDS Gold	LEEDS Platinum		0

Instructions: (1.) Score each alternative for each of the eight aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "fatal flaw". Alternatives that score in this area should not be proposed.

Total Raw Score Calculated	-2
Total Score (Default)	-2

Note: The total score calculated may be more than 25. In the instances where this might occur, a default maximum score of 25 will be calculated.

Aspect	Rationale	Measurement Method
Non-Renewable Energy Consumption	Eco-friendly solutions would be expected to be low consumers of non-renewable energy. Benchmarking energy consumption against conventional secondary treatment provides penalty points for high energy consuming alternatives.	Evaluation of primary energy consumed per MG of flow treated, compared to the energy consumed at the WCWTP per MG treated.
Use of Natural Systems	Natural systems replace concrete and steel construction with wet bottom storage lagoons, constructed bioswales, rain gardens etc. that increase green space of various kinds. Options that reduce wetlands and green space get penalty points.	Acres of wetlands and other types of green space created or eliminated. Also includes subjective evaluation of the "basis" of the alternative - "green" or "grey".
Multiple-Use Facilities	Eco-friendly solutions create recreational opportunities for both water based and riparian recreation. Boating, canoing, kayaking, fishing, wading, swimming etc. would be direct water-based recreation. Bird watching, hiking, biking, picnicing, camping etc. would be considered related riparian recreation.	Subjective evaluation of changes predicted in the aquatic or riparian environment as a result of better water quality, increased base flow or decreased flow peaks, increased tree cover or vegitated riparian areas etc.
Source Control of subwatershed pollutant loads	Controlling pollutant loads at the source through behavior modification, product replacements or stormwater management BMPs that capture pollutants thereby avoiding end of pipe treatment requirements.	Modeled land side pollutant loading reductions as calculated by the BGC Water Quality Tool or by comparison to literature values or pilot program measurements.
Non-Obtrusive Construction Techniques	Probable construction impacts on traffic, noise and dust are all measures of the friendliness of an alternative. Construction impacts get penalty points for creating nuisance conditions.	Subjective evaluation of probable construction impacts based on the type of construction envisioned for the alternative.
Consistent Land Use	Alternative configuration can either enhance or detract from the surrounding property. For example, an extremely unfriendly pump station can be noisy, smelly, and ugly. The same pump station can be "disguised" as a residence that fits right in with the neighborhood. If a larger parcel of land is available, a pump station can be hidden from view by landscaping, and a community garden or other green space added to enhance the neighborhood.	At the planning level, projects can be defined to avoid negative impacts on the surrounding properties. Depending on the availability of land, enhancements are possible. This aspect encourages project definition and budgets to enhance, not detract.
Impermeable Surfaces	Adding impermeable surfaces increases total runoff volume, peak runoff flowrates, and the total transport of any pollutant deposited on the surface from any source. Conversely, permeable surfaces can reduce flow volume and peaks, and provide filtering mechanisms for pollutants.	Acres of permeable surfaces created or eliminated.
LEEDS Performance	LEED standards are applicable to alternatives that include above-ground building structures.	Application of LEED evaluation points.

Acronyms
BGC - Beargrass Creek
LEEDS - Leadership in Energy and Environmental Design
MG - million gallons
WCWTP - West County Wastewater Treatment Plant

MSD
Louisville / Jefferson County Metropolitan Sewer District

SSO SSDP
Modeled Solutions
Project Fact Sheet

PROJECT WIN
Waterway Improvements Now

SSO Project Number: S_MI_MF_NB06_01_C_B

Modeled Area: Middle Fork

Branch or SSO ID: MF06

Project Type: Diversion and Pump Station

Receiving Stream: Middle Fork

Project Description: This alterative includes a diversion for 01106 with Gravity Pipe, a diversion for 00746 with Gravity Pipe, and an upgrade Pump Station at MSD0057 with flow diverted to 00746 diversion.

Reason for Overflow: Bypass Pipe at Vannah Way. Undersized Pumps at Anchor Estates # 1 and # 2.

Design Parameters / Assumptions: This solution is based on a 2 year - 3 hour rain event

Project Constraints: None at this time

Estimated Capital Cost (2010 dollars): $2,886,239

Weighted Benefit/Cost Ratio (Capital Cost): 20.10

Overflow Points Addressed:

SSO	SSO Name	Service Area	Overflow Type	Discharge To	Average Overflow / Incident (gallons)	Number of Overflow/ Yr
00746	Anchor Estates # 1 PS	Morris Forman	Pumped	Ditch	8,023	27.6
MSD0057	Anchor Estates # 2 PS	Morris Forman	Capacity	Stream	9,183	31.0
01106	Foxboro Dr / End of St PS	Morris Forman	Bypass	Catchbasin	No Data	1.7

MSD

Project Cost Summary Sheet

Project ID: S_MI_MF_NB06_M_01_C_B

Description: Diversion for 01106 with Gravity Pipe, Diversion for 00746 with Gravity Pipe, Upgrade Pump Station at MSD0057 and divert to 00746 diversion.

Estimate Date: 5/16/2008

Prepared By: Bill Sanders, P.E. Heritage Engineering

Printed Date: 6/18/2008

Cost Estimate Description		Totals
Estimated Open Cut Sewer Construction Cost	$	617,000
Estimated Tunneling Construction Cost	$	-
Estimated Off-line Storage Facilities Construction Cost	$	-
Estimated I/I Removal Cost	$	-
Estimated Pump Station Cost	$	832,000
Estimated Flow Control Structure	$	-
Estimated Earthen Basin Cost	$	-
Estimated Force Main Cost	$	-
Estimated High Rate Treatment Cost	$	-
Estimated Screening Cost	$	-
Misc. Extra Cost Description:	$	-
Total Estimated Construction Cost =	**$**	**1,449,000**

Real Estate Costs Description			Totals
Easement Cost	# of Properties = 11	$	21,439
Property Acquisition		$	-
Misc. Extra Cost Description:		$	-
Total Additional Costs =		**$**	**21,000**

Multipliers Description	Multiplier
Administration Costs	4%
Contingencies	25%
Interest	6%
Miscellaneous	9%
Engineering & Inspection	8%
Design Services	5%
Program Management	4%
Planning & Preliminary Design	2%
Performance Bond	1%
Total Multipliers =	**64%**

Data File Base ENRCCI	7312	**PROJECT CAPITAL COST ESTIMATE =**	$ 2,411,000
Data File ENRCCI in use	7888	**Project 20 Year Present Worth Estimate =**	$ 2,321,000

For Economy of Scale when dealing with the facility worksheets for a facility whose size is far greater than the largest available on the curve use the following Economy of Scale equation to adjust the cost and enter the adjustment in the Misc. Extra Cost: (Professional Engineering judgement to be used for decision to use this adjustment.)

$$C = Cr (Qc / Qr) ^ m$$

Cr = cost from tool at maximum size for facility cost curve

Qc = design size

Qr = maximum size for facility from cost curve

C = cost for design size Qc

m = correlation exponent (0 < m < 1) Use 0.6 for all structures.

EXAMPLE: For a BF facility of 500 MGD where 100 is the maximum size on the curve use.

C = $41,686,164 * (500 / 100) ^ 0.6	=	$	109,489,869
C500 from Tool	=	$	208,281,000
Difference (C - C500)	=	**$**	**(98,791,131)**

Enter the Difference as a negative value in the Misc. Extra Cost row and enter in Economy of Scale Adjustment in the Description.

Benefit/Cost Model Cost Data		
Capital Cost	$	2,886,239
Total Present Worth	$	2,515,790

MSD

ENRCCI overwrite by Estimator 8550

PROJECT CAPITAL COST ESTIMATE =	$ 2,613,343
Project 20 Year Present Worth Estimate =	$ 2,515,790
Construction Cost Estimate =	$ 1,593,370

Project Values Summary Sheet

Value Description	Totals
Length of Open Cut Sewer Conveyance (Feet)	3,950
Length of Tunnel Sewer Conveyance (Feet)	0
Off-line Storage Annual Volume Stored (Million Gallons)	0
Off-line Storage Estimated # of Annual Occurrence	0
Flow Control Structure Annual Volume Stored (Million Gallons)	0
Flow Control Structure Estimated # of Annual Occurrence	0
Earthen Basin Annual Volume Stored (Million Gallons)	0
Earthen Basin Estimated # of Annual Occurrence	0
Annual Volume of Pumping (Million Gallons)	73
Estimated Total Dynamic Head of Pumping (Feet)	40
Length of Force Main Conveyance (Feet)	0
Annual Volume of High Rate Treatment (Million Gallons)	0
High Rate Treatment Estimated # of Annual Occurrences	0
Screening Estimated # of Annual Occurrences	0
Screening Annual Volume Disinfected	0

MSD

OPEN CUT SEWER CONSTRUCTION VALUE ENTRY SHEET

Project ID: *S_MI_MF_NB06_M_01_C_B*

Estimate Date: 5/16/2008

Printed Date: 6/18/2008

Prepared By: Bill Sanders, P.E. Heritage Enginee

Segment ID	*Pipe Size (in)	Length of Pipe in Street (ft)	Length of Pipe out of Street (ft)	**Average Depth (ft)	# of San. Service Laterals	# of Aband'd Inlets	# of New Inlets	# of Water Services Replaced	Street Width (ft)	# of Manholes	# of Diversion Structures	# of Existing MH Surface Rehabs	Small Medium or Large Creek Crossing (S,M, or L)	Sewer in Rock	Dewatering Required	Maintenance of Flow	Brownfields	Clearing and Grubbing	Traffic Maintenance Required	Urban Alignment	Total Cost Per Segment
00746-1	10	400	0	5	0	0	0	1	20	2	0	0		x							$ 125,862
00746-2	10	0	2,500	5	0	0	0	0	0	8	0	0		x				x			$ 162,623
00746(XS)	10	0	10	5	0	0	0	0	0	0	0	0	S	x	x			x			$ 25,133
00746(XS)	10	0	10	5	0	0	0	0	0	0	0	0	S	x	x			x			$ 25,133
00746(XS)	10	0	10	7	0	0	0	0	0	0	0	0	S	x	x			x			$ 26,087
00746(XS)	10	0	10	5	0	0	0	0	0	0	0	0	S	x	x			x			$ 25,133
00746 (MD XS	10	0	10	5	0	0	0	0	0	0	0	0	M	x	x						$ 93,458
00746-3	10	100	550	7	0	0	0	0	15	0	0	0		x	x			x	x		$ 82,035
01106	8	100	250	5	0	0	0	0	20	2	0	0		x	x			x	x		$ 51,262
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -

3,950 = **Total Length of Open Cut Job**

3,950 = **Total Length of Sanitary Sewer in Rock**

Total Cost for Construction = $ 616,724

Small Job Multiplier = 0%

Estimated Total Sewer Construction Cost = $ 616,724

* - Use standard pipe sizes with maximum pipe size of 144 inches

** - Minimum depth is 5 feet. For depths that are greater than 25 feet use Tunneling worksheet

MSD

PUMP STATIONS VALUE ENTRY SHEET

Project ID: *S_MI_MF_NB06_M_01_C_B*

Estimate Date: 5/16/2008

Printed Date: 6/18/2008

Prepared By: Bill Sanders, P.E. Heritage Engineerin

Facility ID	**Estimated Depth (ft)	Estimated Total Head (ft)	*Estimated Peak Flow Rate (MGD)	***In Rock	Odor Control	Grinders Required	Add Grit Pit	Dewatering Required	Brownfields	Exclude Structure (-%)	Total Cost Per Facility
MSD0057	13	40	0.2	x	x			x		-50%	$ 831,854
B	0	0	0							0%	$ -
C	0	0	0							0%	$ -
D	0	0	0							0%	$ -
E	0	0	0							0%	$ -

Enter Description if Exclude Structure -% used:

Wet Well may need to be re-built. Other site facilities should be sufficient.

Estimated Total Pump Station Construction Cost = $ 831,854

* - Pump station cost curve limits out at 200 MGD. If over 200 MGD use multiple pump stations and do not check box any extras or reenter the same depth.
** - Cost per linear foot increases at depths of 20, 50, 100 and 150 feet.
*** - Being in rock is beneficial at depths greater than 50 feet. In Rock should not be checked at these depths.

Cluster Comparison

S_MI_MF_NB06_01_C_B Divert 01106, Upsize Pump Station at MSD 0057, Divert 00746

CSO/SSO ID[5]		Raw Benefit Score[2,4] Regulatory Performance	Public Health	Asset Protection	Environmental Enhance	Eco-Friendly Solutions
01106		12	0	3	3	-2
00746		21	10	3	3	-2
MSD0057		12	3	3	3	-2
000		0	0	0	0	0
000		0	0	0	0	0
000		0	0	0	0	0
000		0	0	0	0	0
000		0	0	0	0	0
Weighting Factor		8	10	6	8	6
Weighted Benefit Score		360	130	54	72	-36
Total Benefit Score	580					
Total Capital Cost[3]	$2,601,000					
Total Present Worth Costs[3]	$2,295,000					
Weighted Benefit/Cost Ratio (Capital Costs)	22.30					
Weighted Benefit/Cost Ratio (Total Present Worth Costs)	25.27					

Notes:

1. Data Input Cells are highlighted in yellow
2. Raw Benefit Scores for Regulatory Performance and Public Health values are from the CSO or SSO Level of Control Benefit Sheets
3. Capital and Total Present Worth Costs from the"Proj Summary" Page of the Cost Model for the clustered alternative
4. Formulas are referenced based on existing template layout, if template is changed make sure to double check referenced cells highlighted in gray
5. Use treatment plant name as ID for CSO/SSO projects that require improvements to the treatment plant

2-Year	Network Branch #6										
Value:	Regulatory Performance - SS0s										
	Measure	Impact / Frequency						Rationale	Measurement Method		
Performance Measure	SSOs	6 month	1 Year	2 Year	5 Year	10 Year	Modeled Overflow Point or No discharge	Regulations do not distinguish between potential impact of SSOs, therefore frequency and impact are the same for Regulatory Performance value.. Modeled Overflow Points are not considered until verified.	Measurement methods will be via hydraulic models to quantify the SSO discharge.		
Frequency	Value	25	16	9	4	1	0		Base	Prop	
	01106		BL		PR				16	4	12
	00746	BL			PR				25	4	21
	MSD0057-LS		BL		PR				16	4	12
Note - This value sheet calculates the total benefit.									Subtotal		45

Acronyms
AAOV - Average annual overflow volume
CSO - Combined sewer overflow
WQS - Water quality standards
WWTPs - Wastewater treatment plants
BL - Baseline
PR - Proposed

01106 - 2 YR	Network Branch #6										
Value:	Public Health Enhancement - SSOs										
	Measure	Release Impact						Rationale	Measurement Method		
Performance Measures	SSOs	Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals	Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals	Release 50,000 - 99,999 Gals	Release 20,000-49,999 Gals	Release 10,000 - 19,999 Gals	No discharge	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	6 Month	25	20	15	10	5	0		0	0	0
	1 Year	20	16	12	8	4	0	1,000 GL BL	0	0	0
	2 Year	15	12	9	6	3	0	2,000 GL BL	0	0	0
	5 Year	10	8	6	4	2	0	5,000 GL BL	0	0	0
	10 Year	5	4	3	2	1	0	8,000 GL BL	0	0	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								Average Total Score			0
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system BL - Baseline GL - Gallons								Corrected Score			0

00746 - 2 YR	Network Branch #6										
Value:	**Public Health Enhancement - SSOs**										
	Measure	**Release Impact**						**Rationale**	**Measurement Method**		
Performance Measures	**SSOs**	**Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals**	**Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals**	**Release 50,000 - 99,999 Gals**	**Release 20,000-49,999 Gals**	**Release 10,000 - 19,999 Gals**	**No discharge**	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	**6 Month**	25	20	15	10	5	0	10,000 Gal BL	5	0	5
	1 Year	20	16	12	8	4	0	30,000 Gal BL	8	0	8
	2 Year	15	12	9	6	3	0	60,000 Gal BL	12	0	12
	5 Year	10	8	6	4	2	0	100,000 GL BL	8	4	4
	10 Year	5	4	3	2	1	0	150,000 GL BL	4	4	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								**Average Total Score**			6
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system BL - Baseline GL - Gallons								**Corrected Score**			10

MSD0057-LS - 2 YR Network Branch #6											
Value:	**Public Health Enhancement - SSOs**										
	Measure	**Release Impact**						**Rationale**	**Measurement Method**		
Performance Measures	**SSOs**	**Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals**	**Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals**	**Release 50,000 - 99,999 Gals**	**Release 20,000-49,999 Gals**	**Release 10,000 - 19,999 Gals**	**No discharge**	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	**6 Month**	25	20	15	10	5	0		0	0	0
	1 Year	20	16	12	8	4	0	6,000 GL - BL	0	0	0
	2 Year	15	12	9	6	3	0	25,000 GL - BL	6	0	6
	5 Year	10	8	6	4	2	0	60,000 GL - BL	8	6	2
	10 Year	5	4	3	2	1	0	100,000 GL - BL	4	4	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								**Average Total Score**			2
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system BL - Baseline GL - Gallons								**Corrected Score**			3

S_MI_MF_NB06_01_C_B														
Value:	Asset Protection													
	Measure			Impact						Rationale	Measurement Method			
Performance Measures		Flood Damage		Homes or businesses are subject to severe structural damage	Homes or businesses are subject to minor to moderate structural damage	Flooding limits access to homes or businesses	Flooding limits access to recreational areas	Standing water on property, but access not affected and no damage expected	No standing water	Stormwater BMPs can reduce stormwater peaks and reduce extent of flooded areas, while sewer separation may increase localized stormwater peak flows and increase the flooding impacts of storms. Alternatively, purchase of highly impacted properties may be a cheaper way to reduce flood damage and create green space and buffer zones	Drainage models where available, historic customer complaints from MSD Customer Information System, or historic observations of flood-prone areas combined with the expected relative impacts of sewer system modifications on storm water flows			
		Basement Back-ups		Sewer surcharging within 6 feet of ground surface for more than 20% of manholes	Sewer surcharging within 6 feet of ground surface for 10 - 20% of manholes	Sewer surcharging within 6 feet of ground surface for 5 - 10% of manholes	Sewer surcharging within 6 feet of ground surface for 1 - 5% of manholes	Sewer surcharging within 6 feet of ground surface for 0 - 1% of manholes	No surcharging within 6 feet of ground surface	First floor levels are typically 1 - 2 feet above ground surface, and basement floors are typically 8 - 10 feet below the first floor. A sewer surcharge of 6 feet below ground surface is highly likely to cause back-ups in homes with basement service	Measurement methods will be via hydraulic models to quantify the hydraulic grade lines compared to ground surface elevations at manholes			
	Storm Events	→		Most Severe Impact				Least Impact	No Impact					
		↓		5	4	3	2	1	0	Assumptions	Base Case Score	Alternative Score	Total Score	
Frequency	6 Month	Most Likely	5	25	20	15	10	5	0		10	5	5	
	1 Year		4	20	16	12	8	4	0		8	4	4	
	2 Year		3	15	12	9	6	3	0		6	6	0	
	5 Year		2	10	8	6	4	2	0		4	4	0	
	10 Year	Least Likely	1	5	4	3	2	1	0		3	2	1	
	Not Possible	Not Possible	0	0	0	0	0	0	0	Average			2	
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.										Total Score			3	
Acronyms BMPs - Best management practices														

S_MI_MF_NB06_01_C_B														
Value:	**Environmental Enhancement**													
Aspect	Scoring													
	-5	-4	-3	-2	-1	0	1	2	3	4	5	Assumptions	Score Per Aspect
Aquatic and Terrestrial Habitat Protection	Elimination or habitat for rare or endangered species	Elimination of significant amount of common habitat	Elimination of minor amount of common habitat	Significant habitat impairment	Minor impairment to existing habitat	No impact on habitat	Minor enhancement of existing habitat	Significant enhancement of existing habitat	Creation of some amount of common habitat	Creation of significant amount of common habitat	Creation of critical habitat for rare or endangered species		
Aesthetics - Solids and Floatables	75% - reduction in volume of flow with no S&F capture	50 - 75% of flow with no S&F removal	25 - 50% of flow with no S&F removal	10 - 25% of flow with no S&F removal	Reduced efficiency of existing S&F control device (5 - 10% of flow with no S&F control)	Non-Surge or S&F removal	10 - 12% of discharged flow routed with passive S&F removal (screens)	15 - 20 % of discharged flow routed with passive S&F removal (screens)	25 - 50% of discharged flow treated with positive S&F removal (screens)	50 - 75% of discharged flow treated with positive S&F removal (screens)	75% + of discharges flow treated with positive S&F removal (screens)		
Aesthetics - Odor and Air Emissions	Create annoying odor source affecting > 30 customers once	Create annoying odor source affecting >20 customers often, or >30 customers occasionally	Create annoying odor source affecting >20 customers occasionally	Create direct/near odor source affecting > 50 customers occasionally	Create direct/near odor source affecting > 50 customers occasionally	No impact on odors	Eliminate direct/near odor source affecting > 50 customers occasionally	Remove near/near odor source affecting > 50 customers often	Remove annoying odor source affecting >20 customers often or >30 customers occasionally	Remove annoying odor source affecting >20 customers often or >30 customers occasionally	Eliminate annoying odor source affecting >30 customers often		
Dissolved Oxygen Impacts	Reduction in in-stream DO to 0 mg/l - during critical flow period	Continuous reduction of in-stream DO to 2 mg/l	Continuous reduction of in-stream DO 2 - 4 mg/l during critical conditions	Intermittent reduction of in-stream DO 2 mg/l - possible reduction in in-stream DO 2 - 4 mg/l during critical conditions	Intermittent reduction of in-stream DO 2 - 3 mg/l possible during non-critical conditions	No DO impacts	Intermittent improvement in in-stream DO 2 - 3 mg/l	Intermittent improvement in in-stream DO 3 - 4 mg/l. Intermittent critical condition improvements 3 - 4 mg/l	Continuous improvement of in-stream DO 3 - 4 mg/l. Intermittent critical condition improvements 3 - 4 mg/l	Continuous improvement of in-stream DO 3 - 4 mg/l.	Continuous improvement of critical condition in-stream DO 2 mg/l.		
Downstream Impacts	75% - increase in annual BOD or nutrient loads	50 - 75% increase in annual BOD or nutrient loads	25 - 50% increase in annual BOD or nutrient loads	10 - 25% increase in annual BOD or nutrient loads (CSO, - Levels)	Potential 0 - 10 % increase in annual average BOD or nutrient loads (CSO + Levels)	No impact on BOD or nutrient loads (CSO - Levels)	3 - 10% reduction in annual BOD or nutrient loads (CSO - Levels)	10 - 25 % reduction in annual BOD or nutrient loads (CSO - Levels)	25 - 50% reduction in annual BOD or nutrient loads (CSO - Levels)	50 - 75% reduction in annual BOD or nutrient loads (CSO - Levels)	75% + reduction in annual BOD or nutrient loads (CSO - Levels)		
Stream Flow Impacts (Peak flows)	25% - increase in peak flows	10% - 25% increase in peak flows	Up to 10% increase in peak flows	Frequent minimal in flow during critical conditions	Potential minimal in average flow, or minor increase in high flow peaks	No impact on peak flows	Minor reduction in flows for significant peak reduction	Minor reduction in peak flows under some conditions	Up to 10% reduction in peak flows	10% - 25% reduction in peak flows	25%+ reduction in peak flows		
Stream Flow Impacts (DWF only)	25%+ - increase in low during critical conditions	10% - 25% - increase in flow during critical conditions	Up to 10% - increase in flow during critical conditions	Frequent increase in flow during critical conditions	Possible increase in average flow	No impact on average or base stream flow	Intermittent increase in stream flow - not impact to critical conditions	Intermittent increase in stream flow - Some improved critical conditions	5 - 10% permanent increase in stream flow during critical conditions	10 - 25 % permanent increase in stream flow during critical conditions	25%+ permanent increase in stream flow during critical conditions		

Instructions: (1.) Score each alternative for each of the seven aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "total flaw". Alternatives that score in this area should not be proposed.

Total Raw Score Calculated	
Total Score (Default)	0

Aspect	Rationale	Measurement Method
Aquatic and Terrestrial Habitat Protection	Wet weather projects may affect both aquatic and terrestrial habitat through changes in base flow, peak flow, water quality, time cover, channel shape and characteristics etc. Predictive models used to indicate wet weather control measures have a limited ability to predict biological diversity changes, erosion impacts etc., so surrogate metrics must be used to estimate future positive and negative impacts.	Project definition may specifically address changes in channel shape and configuration, tree cover etc. Predictive models will address DO and other water quality impacts. Flow models will predict base flow and peak flow rates to allow estimates of changes in erosion and water surface area.
Aesthetics - Solids and Floatables	Most CSOs have some form of solids and floatables control facilities. Improvements in capture rates can be expected with screening, or other advanced treatment options. Storm water retention, constructed wetlands, and other control systems may provide solids and floatables removal as well. While reduction in solids and floatables removal efficiency is not likely, penalty points will be assessed if this is possible with any alternative.	Current solids and floatables removal efficiency has been estimated for all sites with control technology. Improvements in removal efficiencies will be estimated for all alternatives that add screening or other advanced treatment technologies. Where treatment is proposed for storm water discharges removals will be estimated based on published removal data.
Aesthetics - Odor and Air Emissions	Odors and air emissions can be generated in storage systems, pump stations, force mains, and long flat sewers. Odors are generally characterized by both the intensity and the quality of the odor. Detectability and annoying are two common descriptors of different intensities and qualities of odors from sewage handling facilities.	Odor emissions from sewage handling facilities can be modeled for intensity, quality, and geographic spread. For planning purposes this level of evaluation is not common, and will not be done except in very rare circumstances. The potential for odor and air emissions will be estimated based on typical applications and model predictions for storage time, number of events, average flow velocities etc.
Dissolved Oxygen Impacts	Dissolved oxygen in streams is dependent on a variety of factors including BOD load, nutrient load, stream flow velocity, water temperature, etc.	For BOD, the Water Quality Tool will be used to estimate the impacts of various loading conditions, flows, temperatures, etc. Probable impacts of individual projects will be estimated based on comparisons to the various stream condition scenarios.
Downstream Impacts	Downstream impacts refer to conditions in the Ohio River below Jefferson County. Nutrient loadings in the Ohio (not just Jefferson County) have been identified as the source of 30 - 45% of the total nutrient loads reaching the Gulf of Mexico. BOD is not likely to persist in the river long enough to get to the Gulf, but can have detrimental impacts far downriver.	Pollutant removals will be estimated based on reductions in annual average loads, since the downstream impacts are primarily long-term and cumulative.
Stream Flow Impacts (Peak flows)	Extremely high peak flows as are often caused by urbanization of a watershed can erode the streambed. Damage aquatic and terrestrial habitat, make water based recreation unsafe or impractical.	Predictive models can estimate flow peaking factors from individual sources, and the Water Quality Tool has a hydraulic component to estimate stream flows during various storm events.
Stream Flow Impacts (DWF only)	Diversion of flows away from a stream due to abandonment of a treatment plant etc. can reduce base flows in a stream. Alternatively, other control measures such as groundwater pumping can increase base flows with beneficial results.	Predictive models can estimate flows from individual sources, and the Water Quality Tool has a hydraulic component to estimate stream flows during various dry weather events.

Acronyms:
BGC - Beargrass Creek
BOD - Biological oxygen demand
CSO - Combined sewer overflow
DO - Dissolved oxygen
DWF - Dry weather flow
mg/l - Milligram per liter
S&F - Solids and floatables

S_MI_MF_NB06_01_C_B													
Value:	**Eco-Friendly Solutions**												
	Scoring												
Aspect	-5	-4	-3	-2	-1	0	1	2	3	4	5	Assumptions	Score Per Aspect
Non-Renewable Energy Consumption	Primary energy consumption is greater than secondary treatment	Primary energy consumption equal to 75-100% of secondary treatment	Primary energy consumption equal to 50-75% of secondary treatment	Primary energy consumption equal to 25-50% of secondary treatment	Primary energy consumption equal to 0 - 15% of secondary treatment	No energy consumption except for cleaning and maintenance	Cleaning and maintenance not needed, no primary consumption	NA	NA	NA	NA		
Use of Natural Systems	Constructed facilities permanently displace >5 acres wetlands or 50+% locally available green space	Constructed facilities permanently displace 3 - 5 acres wetlands or 25 - 50% locally available green space	Constructed facilities permanently displace 1 - 3 acres wetlands or 10 - 15% locally available green space	Constructed facilities permanently displace 0 - 1 acre wetlands or up to 10% locally available green space	Constructed facilities temporarily disrupt wetlands or green space	Alternative does not use or affect natural systems, wetlands, or green space	Alternative doesn't not use natural systems, but enhances green space or environ	Natural systems play a minor role in alternative function; up to 1 acre wetland or 10% additional green space created	Natural systems are significant part of alternative function; 1 - 3 acres of wetland created or 10 - 25% additional green space	Alternative fully uses natural systems; 3 - 5 acres of wetland created or 25-50% additional green space	Alternative results in multi-use natural system development; 5+ acres of wetland or 50+ additional green space		
Multiple-Use Facilities	Constructed facilities permanently eliminate recreational opportunity	Constructed facilities significantly impare recreational opportunity	Constructed facilities moderately impare recreational opportunity	Constructed facilities have minor impacts on recreational opportunity	Construction temporarily impacts recreational opportunity	No impacts on recreational opportunities	Alternative improves access to existing recreational areas	Alternative has limited positive impact on recreation	Alternative significantly enhances recreational opportunities	Alternative increases recreational opportunities in area	Alternative results in multi-use facility		
Source Control of subwatershed pollutant loads	Pollutant loadings are increased by 50%	Pollutant loadings are increased by 30 - 50%	Pollutant loadings are increased by 10 - 30%	End of pipe pollutant loadings are increased by 0 - 10%	End of pipe pollutant loadings are more or less consistent, but likely higher	End of pipe pollutant loadings are unchanged	Pollutant loadings impacts are inconclusive, but likely lower	Source control reduces pollutant loadings by 0 - 10%	Source control reduces pollutant loadings by 10 - 30%	Source control reduces pollutant loadings by 30 - 50%	Source control reduces pollutant loadings by more than 50%		
Non-Obtrusive Construction Techniques	Permanent loss of green space or sensitive area disruption	Main thoroughfare closures, sensitive area temporary disruptions	Widespread dust and noise, blasting, secondary street closures	Localized dust, noise and local street closures	Minor dust and noise, traffic lane closures	No construction impacts	NA	NA	NA	NA	NA		
Consistent Land Use	Intrusive or nuisance facilities inconsistent with neighborhood or land use	Facilities inconsistent with neighborhood or land use	Facility characteristics mitigated to reduce impact on neighborhood	Facilities have significant impact on development density or land use	Facility has minor impact on development density or land use	No impact on land use or no above ground facilities	Alternative mitigates existing compatibility problem	Alternative removes facility inconsistent with neighborhood	Alternative removes nuisance facility from neighborhood	Alternative enhances property values in neighborhood	Alternative provides enhancements that significantly improve neighborhood		
Impermeable Surfaces	5 acres + of impermeable surfaces are added	3 -5 acres of impermeable surfaces are added	1 - 3 acres of impermeable surfaces are added	up to 1 acre of impermeable surfaces are added	Minor increase in impermeable surfaces added	No change in impermeable surface	Minor reduction in impermeable surfaces	Up to 1 acre of impermeable surfaces removed	1 - 3 acres of impermeable surfaces removed	3 - 5 acres of impermeable surfaces removed	More than 5 acres of impermeable surfaces removed		
LEEDS Performance	NA	NA	NA	NA	NA	LEEDS not applicable or LEEDS score <10	LEEDS Score 10 - 25	LEEDS Certified	LEEDS Silver	LEEDS Gold	LEEDS Platinum		

Instructions: (1.) Score each alternative for each of the eight aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "fatal flaw". Alternatives that score in this area should not be proposed.

Total Raw Score Calculated	-4
Total Score (Default)	-2

Note: The total score calculated may be more than 25. In the instances where this might occur, a default maximum score of 25 will be calculated.

Aspect	Rationale	Measurement Method
Non-Renewable Energy Consumption	Eco-friendly solutions would be expected to be low consumers of non-renewable energy. Benchmarking energy consumption against conventional secondary treatment provides penalty points for high energy consuming alternatives.	Evaluation of primary energy consumed per MG of flow treated, compared to the energy consumed at the WCWTP per MG treated.
Use of Natural Systems	Natural systems replace concrete and steel construction with wet bottom storage lagoons, constructed bioswales, rain gardens etc. that increase green space of various kinds. Options that reduce wetlands and green space get penalty points.	Acres of wetlands and other types of green space created or eliminated. Also includes subjective evaluation of the "basis" of the alternative ("green" or "grey".
Multiple-Use Facilities	Eco-friendly solutions create recreational opportunities for both water-based and riparian recreation. Boating, canoing, kayaking, fishing, wading, swimming etc. would be direct water-based recreation. Bird watching, hiking, biking, picnicing, camping etc., would be considered related riparian recreation.	Subjective evaluation of changes predicted in the aquatic or riparian environment as a result of better water quality, increased base flow or decreased flow peaks, increased tree cover or vegetated riparian areas etc.
Source Control of subwatershed pollutant loads	Controlling pollutant loads at the source through behavioral modification, product replacements or stormwater management BMP's that capture pollutants thereby avoiding end of pipe treatment requirements.	Modeled land side pollutant loading reductions as calculated by the BGC Water Quality Tool or by comparison to literature values or pilot program measurements.
Non-Obtrusive Construction Techniques	Probable construction impacts on traffic, noise and dust are all measures of the friendliness of an alternative. Construction impacts get penalty points for creating nuisance conditions.	Subjective evaluation of probable construction impacts based on the type of construction envisioned for the alternative.
Consistent Land Use	Alternative configuration can either enhance or detract from the surrounding property. For example, an extremely unfriendly pump station can be noisy, smelly, and ugly. The same pump station can be "disguised" as a residence that fits right in with the neighborhood. If a larger parcel of land is available, a pump station can be hidden from view by landscaping, and a community garden or other green space added to enhance the neighborhood.	At the planning level, projects can be defined to avoid negative impacts on the surrounding properties. Depending on the availability of land, enhancements are possible. This aspect encourages project definition and budgets to enhance, not detract.
Impermeable Surfaces	Adding impermeable surfaces increases total runoff volume, peak runoff flowrates, and the total transport of any pollutant deposited on the surface from any source. Conversely, permeable surfaces can reduce flow volume and peaks, and provide filtering mechanisms for pollutants.	Acres of permeable surfaces created or eliminated.
LEEDS Performance	LEED standards are applicable to alternatives that include above-ground building structures.	Application of LEED evaluation points.

Acronyms

BGC - Beargrass Creek
LEEDS - Leadership in Energy and Environmental Design
MG - million gallons
WCWTP - West County Wastewater Treatment Plant

MSD
Louisville / Jefferson County Metropolitan Sewer District

SSO SSDP
Modeled Solutions
Project Fact Sheet

PROJECT WIN
Waterway Improvements Now

SSO Project Number:	S_MI_MF_M_NB06_01_C_C
Modeled Area:	Middle Fork
Branch or SSO ID:	MF06
Project Type:	Diversion and Storage
Receiving Stream:	Middle Fork
Project Description:	This alterative includes a diversion for 01106 with Gravity Pipe, a diversion for 00746 with Gravity Pipe, and storage at MSD0057.
Reason for Overflow:	Bypass Pipe at Vannah Way. Undersized Pumps at Anchor Estates # 1 and # 2.
Design Parameters / Assumptions:	This solution is based on a 2 year - 3 hour rain event
Project Constraints:	None at this time
Estimated Capital Cost (2010 dollars):	$1,723,441
Weighted Benefit/Cost Ratio (Capital Cost):	32.26

Overflow Points Addressed:

SSO	SSO Name	Service Area	Overflow Type	Discharge To	Average Overflow / Incident (gallons)	Number of Overflow/ Yr
00746	Anchor Estates # 1 PS	Morris Forman	Pumped	Ditch	8,023	27.6
MSD0057	Anchor Estates # 2 PS	Morris Forman	Capacity	Stream	9,183	31.0
01106	Foxboro Dr / End of St PS	Morris Forman	Bypass	Catchbasin	No Data	1.7

MSD

Project Cost Summary Sheet

Project ID: S_MI_MF_M_NB06_01_C_C

Description: Diversion for 01106 with Gravity Pipe, Diversion for 00746 with Gravity Pipe, Storage at MSD0057

Estimate Date: 5/16/2008

Prepared By: Bill Sanders, P.E. Heritage Engineering

Printed Date: 6/18/2008

Cost Estimate Description		Totals
Estimated Open Cut Sewer Construction Cost	$	920,000
Estimated Tunneling Construction Cost	$	-
Estimated Off-line Storage Facilities Construction Cost	$	-
Estimated I/I Removal Cost	$	-
Estimated Pump Station Cost	$	-
Estimated Flow Control Structure	$	-
Estimated Earthen Basin Cost	$	-
Estimated Force Main Cost	$	-
Estimated High Rate Treatment Cost	$	-
Estimated Screening Cost	$	-
Misc. Extra Cost Description:	$	-
Total Estimated Construction Cost =	**$**	**920,000**

Real Estate Costs Description			Totals
Easement Cost	# of Properties =	11	$ 21,439
Property Acquisition			$ -
Misc. Extra Cost Description:			$ -
Total Additional Costs =			**$ 21,000**

Multipliers Description	Multiplier
Administration Costs	4%
Contingencies	30%
Interest	6%
Miscellaneous	9%
Engineering & Inspection	8%
Design Services	5%
Program Management	4%
Planning & Preliminary Design	2%
Performance Bond	1%
Total Multipliers =	**69%**

Data File Base ENRCCI	7312	**PROJECT CAPITAL COST ESTIMATE =**	$ 1,590,000
Data File ENRCCI in use	7888	**Project 20 Year Present Worth Estimate =**	$ 1,288,000

For Economy of Scale when dealing with the facility worksheets for a facility whose size is far greater than the largest available on the curve use the following Economy of Scale equation to adjust the cost and enter the adjustment in the Misc. Extra Cost: (Professional Engineering judgement to be used for decision to use this adjustment.)

$$C = Cr (Qc / Qr) ^ m$$

Cr = cost from tool at maximum size for facility cost curve

Qc = design size

Qr = maximum size for facility from cost curve

C = cost for design size Qc

m = correlation exponent (0 < m < 1) Use 0.6 for all structures.

EXAMPLE: For a BF facility of 500 MGD where 100 is the maximum size on the curve use:

C = $41,686,164 * (500 / 100) ^ 0.6	=	$	109,489,869
C500 from Tool	=	$	208,281,000
Difference (C - C500)	=	**$**	**(98,791,131)**

Enter the Difference as a negative value in the Misc. Extra Cost row and enter in Economy of Scale Adjustment in the Description.

Benefit/Cost Model Cost Data		
Capital Cost	$	1,723,441
Total Present Worth	$	1,396,095

MSD

ENRCCI overwrite by Estimator 8550

PROJECT CAPITAL COST ESTIMATE =	**$ 1,723,441**
Project 20 Year Present Worth Estimate =	**$ 1,396,095**
Construction Cost Estimate =	**$ 1,019,973**

Project Values Summary Sheet

Value Description	Totals
Length of Open Cut Sewer Conveyance (Feet)	4,100
Length of Tunnel Sewer Conveyance (Feet)	0
Off-line Storage Annual Volume Stored (Million Gallons)	0
Off-line Storage Estimated # of Annual Occurrence	0
Flow Control Structure Annual Volume Stored (Million Gallons)	0
Flow Control Structure Estimated # of Annual Occurrence	0
Earthen Basin Annual Volume Stored (Million Gallons)	0
Earthen Basin Estimated # of Annual Occurrence	0
Annual Volume of Pumping (Million Gallons)	0
Estimated Total Dynamic Head of Pumping (Feet)	0
Length of Force Main Conveyance (Feet)	0
Annual Volume of High Rate Treatment (Million Gallons)	0
High Rate Treatment Estimated # of Annual Occurrences	0
Screening Estimated # of Annual Occurrences	0
Screening Annual Volume Disinfected	0

MSD

OPEN CUT SEWER CONSTRUCTION VALUE ENTRY SHEET

Project ID: *S_MI_MF_M_NB06_01_C_C*

Estimate Date: 5/16/2008

Printed Date: 6/18/2008

Prepared By: Bill Sanders, P.E. Heritage Enginee

Segment ID	*Pipe Size (in)	Length of Pipe in Street (ft)	Length of Pipe out of Street (ft)	**Average Depth (ft)	# of San. Service Laterals	# of Aband'd Inlets	# of New Inlets	# of Water Services Replaced	Street Width (ft)	# of Manholes	# of Diversion Structures	# of Existing MH Surface Rehabs	Small Medium or Large Creek Crossing (S,M, or L)	Sewer in Rock	Dewatering Required	Maintenance of Flow	Brownfields	Clearing and Grubbing	Traffic Maintenance Required	Urban Alignment	Total Cost Per Segment
00746-1	8	400	0	5	0	0	0	1	20	2	0	0		x							$ 125,039
00746-2	8	0	2,500	5	0	0	0	0	0	8	0	0		x				x			$ 152,420
00746(XS)	8	0	10	5	0	0	0	0	0	0	0	0	S	x	x			x			$ 25,141
00746(XS)	8	0	10	5	0	0	0	0	0	0	0	0	S	x	x			x			$ 25,141
00746(XS)	10	0	10	7	0	0	0	0	0	0	0	0	S	x	x			x			$ 26,087
00746(XS)	8	0	10	5	0	0	0	0	0	0	0	0	S	x	x			x			$ 25,141
00746 (MD XS)	8	0	10	5	0	0	0	0	0	0	0	0	M	x	x						$ 93,467
00746-3	10	100	550	7	0	0	0	0	15	0	0	0		x	x			x	x		$ 82,035
01106	8	100	250	5	0	0	0	0	20	2	0	0		x	x			x	x		$ 51,262
MSD0057 Stor	72	150	0	13	0	0	0	0	22	2	1	0		x	x				x		$ 314,333

4,100 = **Total Length of Open Cut Job**

4,100 = **Total Length of Sanitary Sewer in Rock**

Total Cost for Construction = $ 920,066

Small Job Multiplier = 0%

Estimated Total Sewer Construction Cost = $ 920,066

* - Use standard pipe sizes with maximum pipe size of 144 inches

** - Minimum depth is 5 feet. For depths that are greater than 25 feet use Tunneling worksheet

Cluster Comparison

S_MI_MF_NB06_01_C_C Divert 01106, Storage at MSD0057, Divert 00746

Raw Benefit Score[2,4]

CSO/SSO ID[5]	Regulatory Performance	Public Health	Asset Protection	Environmental Enhance	Eco-Friendly Solutions
01106	12	0	3	2	-2
00746	21	10	3	2	-2
MSD0057	12	3	3	2	-2
000	0	0	0	0	0
000	0	0	0	0	0
000	0	0	0	0	0
000	0	0	0	0	0
000	0	0	0	0	0
Weighting Factor	**8**	**10**	**6**	**8**	**6**
Weighted Benefit Score	**360**	**130**	**54**	**48**	**-36**

Total Benefit Score	**556**
Total Capital Cost[3]	**$1,450,000**
Total Present Worth Costs[3]	**$1,184,000**
Weighted Benefit/Cost Ratio (Capital Costs)	**38.34**
Weighted Benefit/Cost Ratio (Total Present Worth Costs)	**46.96**

Notes:

1. Data Input Cells are highlighted in yellow
2. Raw Benefit Scores for Regulatory Performance and Public Health values are from the CSO or SSO Level of Control Benefit Sheets
3. Capital and Total Present Worth Costs from the"Proj Summary" Page of the Cost Model for the clustered alternative
4. Formulas are referenced based on existing template layout, if template is changed make sure to double check referenced cells highlighted in gray
5. Use treatment plant name as ID for CSO/SSO projects that require improvements to the treatment plant

2-Year	Network Branch #6										
Value:	**Regulatory Performance - SS0s**										
	Measure	**Impact / Frequency**						**Rationale**	**Measurement Method**		
Performance Measure	**SSOs**	**6 month**	**1 Year**	**2 Year**	**5 Year**	**10 Year**	**Modeled Overflow Point or No discharge**	Regulations do not distinguish between potential impact of SSOs, therefore frequency and impact are the same for Regulatory Performance value.. Modeled Overflow Points are not considered until verified.	Measurement methods will be via hydraulic models to quantify the SSO discharge.		
Frequency	**Value**	25	16	9	4	1	0		Base	Prop	
	01106		BL		PR				16	4	12
	00746	BL			PR				25	4	21
	MSD0057-LS		BL		PR				16	4	12
Note - This value sheet calculates the total benefit.									**Subtotal**		**45**

Acronyms
AAOV - Average annual overflow volume
CSO - Combined sewer overflow
WQS - Water quality standards
WWTPs - Wastewater treatment plants
BL - Baseline
PR - Proposed

01106 - 2 YR	Network Branch #6										
Value:	**Public Health Enhancement - SSOs**										
	Measure	**Release Impact**						**Rationale**	**Measurement Method**		
Performance Measures	**SSOs**	**Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals**	**Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals**	**Release 50,000 - 99,999 Gals**	**Release 20,000-49,999 Gals**	**Release 10,000 - 19,999 Gals**	**No discharge**	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	**6 Month**	25	20	15	10	5	0		0	0	0
	1 Year	20	16	12	8	4	0	1,000 GL BL	0	0	0
	2 Year	15	12	9	6	3	0	2,000 GL BL	0	0	0
	5 Year	10	8	6	4	2	0	5,000 GL BL	0	0	0
	10 Year	5	4	3	2	1	0	8,000 GL BL	0	0	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								**Average Total Score**			0
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system BL - Baseline GL - Gallons								**Corrected Score**			0

00746 - 2 YR	Network Branch #6											
Value:	**Public Health Enhancement - SSOs**											
	Measure	**Release Impact**						**Rationale**	**Measurement Method**			
Performance Measures	**SSOs**	**Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals**	**Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals**	**Release 50,000 - 99,999 Gals**	**Release 20,000-49,999 Gals**	**Release 10,000 - 19,999 Gals**	**No discharge**	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.			
Frequency	**6 Month**	25	20	15	10	5	0	10,000 Gal BL	5	0	5	
	1 Year	20	16	12	8	4	0	30,000 Gal BL	8	0	8	
	2 Year	15	12	9	6	3	0	60,000 Gal BL	12	0	12	
	5 Year	10	8	6	4	2	0	100,000 GL BL	8	4	4	
	10 Year	5	4	3	2	1	0	150,000 GL BL	4	4	0	
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								**Average Total Score**				6
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system BL - Baseline GL - Gallons								**Corrected Score**				10

MSD0057-LS - 2 YR Network Branch #6											
Value:	**Public Health Enhancement - SSOs**										
	Measure	**Release Impact**						**Rationale**	**Measurement Method**		
Performance Measures	**SSOs**	**Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals**	**Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals**	**Release 50,000 - 99,999 Gals**	**Release 20,000-49,999 Gals**	**Release 10,000 - 19,999 Gals**	**No discharge**	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	**6 Month**	25	20	15	10	5	0		0	0	0
	1 Year	20	16	12	8	4	0	6,000 GL - BL	0	0	0
	2 Year	15	12	9	6	3	0	25,000 GL - BL	6	0	6
	5 Year	10	8	6	4	2	0	60,000 GL - BL	8	6	2
	10 Year	5	4	3	2	1	0	100,000 GL - BL	4	4	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								**Average Total Score**			2
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system BL - Baseline GL - Gallons								**Corrected Score**			3

S_MI_MF_NB06_01_C_C														
Value:	Asset Protection													
	Measure			Impact						Rationale	Measurement Method			
Performance Measures		Flood Damage		Homes or businesses are subject to severe structural damage	Homes or businesses are subject to minor to moderate structural damage	Flooding limits access to homes or businesses	Flooding limits access to recreational areas	Standing water on property, but access not affected and no damage expected	No standing water	Stormwater BMPs can reduce stormwater peaks and reduce extent of flooded areas, while sewer separation may increase localized stormwater peak flows and increase the flooding impacts of storms. Alternatively, purchase of highly impacted properties may be a cheaper way to reduce flood damage and create green space and buffer zones	Drainage models where available, historic customer complaints from MSD Customer Information System, or historic observations of flood prone areas combined with the expected relative impacts of sewer system modifications on storm water flows			
		Basement Back-ups		Sewer surcharging within 6 feet of ground surface for more than 20% of manholes	Sewer surcharging within 6 feet of ground surface for 10 - 20% of manholes	Sewer surcharging within 6 feet of ground surface for 5 - 10% of manholes	Sewer surcharging within 6 feet of ground surface for 1 - 5% of manholes	Sewer surcharging within 6 feet of ground surface for 0 - 1% of manholes	No surcharging within 6 feet of ground surface	First floor levels are typically 1 - 2 feet above ground surface, and basement floors are typically 8 - 10 feet below the first floor. A sewer surcharge of 6 feet below ground surface is highly likely to cause back-ups in homes with basement service	Measurement methods will be via hydraulic models to quantify the hydraulic grade lines compared to ground surface elevations at manholes			
	Storm Events			Most Severe Impact				Least Impact	No Impact					
				5	4	3	2	1	0	Assumptions	Base Case Score	Alternative Score	Total Score	
Frequency	6 Month	Most Likely	5	25	20	15	10	5	0		10	5	5	
	1 Year		4	20	16	12	8	4	0		8	4	4	
	2 Year		3	15	12	9	6	3	0		6	6	0	
	5 Year		2	10	8	6	4	2	0		4	4	0	
	10 Year	Least Likely	1	5	4	3	2	1	0		3	2	1	
	Not Possible	Not Possible	0	0	0	0	0	0	0	Average			2	
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25										Total Score			3	

Acronyms
BMPs - Best management practices

S_MI_MF_NB06_01_C_C	NOT USED												
Value:	**Environmental Enhancement**												
	Scoring												
Aspect	-5	-4	-3	-2	-1	0	1	2	3	4	5	Assumptions	Score Per Aspect
Aquatic and Terrestrial Habitat Protection	Elimination of habitat for one or endangered species	Elimination or significant amount of common habitat	Elimination of minor amount of common habitat	Significant habitat impairment	Minor impairment to existing habitat	No impact on habitat	Minor enhancement of existing habitat	Significant enhancement of existing habitat	Creation of minor amount of common habitat	Creation of significant amount of common habitat	Creation of critical habitat for one or endangered species		0
Aesthetics - Solids and Floatables	75%+ reduction in volume of flow with no SAF / outfall	50 - 75% of total with no SAF removal	25 - 50% of flow with no SAF removal	10 - 25% of flow with no SAF removal	Reduces efficiency of existing SAF control device 5 - 10%	No change in SAF removal	0 - 10% of discharged flow treated with proposed SAF removal (volume)	10 - 25 % of discharged flow treated with proposed SAF removal (volume)	25 - 50% of discharged flow treated with proposed SAF removal (volume)	50 - 75% of discharged flow treated with positive SAF removal (volume)	75% + of discharged flow treated with positive SAF removal (volume)		0
Aesthetics - Odor and Air Emissions	Create annoying odor source affecting > 20 customers daily	Create annoying odor source affecting ~20 customers often or ~50 customers occasionally	Create annoying odor source affecting ~20 customers occasionally	Create annoying odor source affecting ~ 10 customers often	Create detectable odor source affecting ~ 10 customers often	No impact on odors	Eliminate detectable odor source affecting ~ 10 customers occasionally	Eliminate detectable odor source affecting ~ 10 customers often	Eliminate annoying odor source affecting ~ 20 customers occasionally	Eliminate annoying odor source affecting ~ 20 customers often or ~75 customers occasionally	Eliminate annoying odor source affecting ~20 customers often		0
Dissolved Oxygen Impacts	Reduction of in-stream DO to < 1 mg/l + during critical flow periods	Continuous reduction of in-stream DO to 1 - 2 mg/l	Continuous reduction of in-stream DO of 2 - 3 mg/l + possible reduction of in-stream DO to 1 - 2 mg/l during critical conditions	Intermittent reduction of in-stream DO of 2 - 3 mg/l + possible reduction of in-stream DO to 1 - 2 mg/l during critical conditions	Intermittent reduction of in-stream DO 2 mg/l + possible reduction during non-critical conditions	No DO impacts	Intermittent improvement of in-stream DO 2 - 3 mg/l	Intermittent improvement of in-stream DO 2 mg/l + continuous improvements 0 - 2 mg/l	Continuous improvement of in-stream DO 2 - 3 mg/l + intermittent critical condition improvements 2 - 4 mg/l	Continuous improvement of in-stream DO 3 - 4 mg/l + intermittent critical condition improvements 2 - 4 mg/l	Continuous improvement of critical condition in-stream DO 2 mg/l +		0
Downstream Impacts	75%+ increase in annual BOD or nutrient loads	50 - 75% increase in annual BOD or nutrient loads	25 - 50% increase in annual BOD or nutrient loads	10 - 25% increase in annual BOD or nutrient loads (CSO + runoff)	Potential 0 - 10 % increase in critical average BOD or nutrient loads (CSO + runoff)	No impact on BOD or nutrient loads (CSO + runoff)	0 - 10% reduction in annual BOD or nutrient loads (CSO + runoff)	10 - 25% reduction in annual BOD or nutrient loads (CSO + runoff)	25 - 50% reduction in annual BOD or nutrient loads (CSO + runoff)	50 - 75% reduction in annual BOD or nutrient loads (CSO + runoff)	75%+ reduction in annual BOD or nutrient loads (CSO +		0
Stream Flow Impacts (Peak flows)	25%+ increase in peak flows	10% - 25% increase in peak flows	0 to 10% increase in peak flows	Potential increase in flow during critical conditions	Potential increase in average flow or minor increase in high flow peaks	No impact on peak flows	Minor reduction in peak flows	Minor reduction in peak flows under going conditions	0 to 10% reduction in peak flows	10% - 25% reduction in peak flows	25%+ reduction in peak flows		0
Stream Flow Impacts (DWF only)	25%+ increase in flow during critical conditions	10% - 25% increase in flow during critical conditions	0 -10% permanent decrease in flow during critical conditions	Possible decrease in flow during critical conditions	Possible decrease in average flow	No impact on average or base stream flow	Insignificant increase in stream flow - not limited to critical conditions	Insignificant increase in stream flow - more improved critical conditions	0 - 10% permanent increase in stream flow during critical conditions	10 - 25 % permanent increase in stream flow during critical conditions	25%+ permanent increase in stream flow during critical conditions		0

Instructions. (1.) Score each alternative for each of the seven aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "total flow". Alternatives that score in this area should not be proposed.

Total Raw Score Calculated	0
Total Score (Output)	0

Note: The total score calculated may be more than 25. In the instances where this might occur, a default maximum score of 25 will be calculated

Aspect	Rationale	Measurement Method
Aquatic and Terrestrial Habitat Protection	Wet weather projects may affect both aquatic and terrestrial habitat through changes in base flow, peak flow, water quality, tree cover, channel shape and characteristics etc. Predictive models used to evaluate wet weather control measures have a limited ability to predict biological diversity changes in/upon impacts etc., so surrogate metrics must be used to estimate future positive and negative impacts.	Project definition may specifically address changes in channel shape and configuration, tree cover etc. Predictive models will address DO and other water quality impacts. Flow models will predict base flow and peak flow rates to allow estimates of changes in erosion and water surface area.
Aesthetics - Solids and Floatables	Most CSOs have some form of solids and floatables control facilities. Improvements in capture rates can be expected with screening or other advanced treatment options. Storm water retention, constructed wetlands, and other control systems may provide solids and floatables removal as well. While reduction in solids and floatables removal efficiency is not likely, penalty points will be assessed if this is possible with any alternative.	Current solids and floatables removal efficiency has been estimated for all sites with control technology. Improvements in removal efficiencies will be estimated for all alternatives that add screening or other advanced treatment technologies. Where treatment is proposed for storm water discharges removals will be estimated based on published removal data.
Aesthetics - Odor and Air Emissions	Odors and air emissions can be generated in storage systems, pump stations, force mains, and long dist sewers. Odors are generally characterized by both the intensity and the quality of the odor. Detectable and annoying are two common descriptors of offsenive intensities and qualities of odors from sewage handling facilities.	Odor emissions from sewage handling facilities can be modeled for intensity, quality, and geographic spread. For planning purposes this level of evaluation is not common, and will not be done except in very rare circumstances. The potential for odor and air emissions will be estimated based on typical applications and model predictions for storage time, number of events, average flow velocities etc.
Dissolved Oxygen Impacts	Dissolved oxygen in streams is dependent on a variety of factors including BOD load, nutrient load, stream flow velocity, water temperature, etc.	For BSC the Water Quality Tool will be used to estimate the impacts of various loading conditions, flows, temperatures, etc. Probable impacts of individual projects will be estimated based on comparisons to the various stream condition scenarios.
Downstream Impacts	Downstream impacts refer to conditions in the Ohio River below Jefferson County. Nutrient loadings in the Ohio (not just Jefferson County) have been identified as the source of 30 - 45% of the total nutrient loads reaching the Gulf of Mexico. BOD is not likely to persist in the river long enough to get to the Gulf, but can have detrimental impacts far downriver.	Pollutant removals will be estimated based on reductions in annual average loads, since the downstream impacts are primarily long term and cumulative.
Stream Flow Impacts (Peak flows)	Extremely high peak flows as are often caused by urbanization of a watershed can erode the streambed, damage aquatic and terrestrial habitat, make water based recreation unsafe or impractical.	Predictive models can estimate flow peaking factors from individual sources, and the Water Quality Tool has a hydraulic component to estimate stream flows during various storm events.
Stream Flow Impacts (DWF only)	Diversion of flows away from a stream due to abandonment of a treatment plant etc., can reduce base flows in a stream. Alternatively, offset control measures such as groundwater pumping can increase base flows with beneficial results.	Predictive models can estimate flows from individual sources, and the Water Quality Tool has a hydraulic component to estimate stream flows during various dry weather events.

Acronyms
ROC - Beargrass Creek
BOD - Biological oxygen demand
CSO - Combined sewer overflow
DO - Dissolved oxygen
DWF - Dry weather flow
mg/l - Milligram per liter
SM - Solids and floatables

S_MI_MF_NB06_01_C_C	NOT USED
Value:	**Eco-Friendly Solutions**

	Scoring												
Aspect	-5	-4	-3	-2	-1	0	1	2	3	4	5	Assumptions	Score Per Aspect
Non-Renewable Energy Consumption	Primary energy consumption is greater than secondary treatment	Primary energy consumption equal to 75 - 100% of secondary treatment	Primary energy consumption equal to 50 - 75% of secondary treatment	Primary energy consumption equal to 15 - 30% of secondary treatment	Primary energy consumption equal to 0 - 15% of secondary treatment	No energy consumption except for cleaning and maintenance	Cleaning and maintenance visit needed; no primary consumption	NA	NA	NA	NA		
Use of Natural Systems	Constructed facilities permanently displace 5+ acres wetlands or 50+ locally available green space	Constructed facilities permanently displace 3 - 5 acres wetlands or 25 - 50% locally available green space	Constructed facilities permanently displace 1 - 3 acres wetlands or 10 - 15% locally available green space	Constructed facilities permanently displace 0 - 1 acre wetlands or up to 10% locally available green space	Constructed facilities temporarily disrupt wetlands or green space	Alternative does not use or affect natural systems, wetlands or green space	Alternative doesn't impact on-site natural systems, but enhances green space or wetland	Natural systems play a minor role in alternative function; up to 1 acre wetland or 10% additional green space created	Natural systems are significant part of alternative function; 1 - 3 acres of wetland created or 15-25% additional green space	Alternative fully uses natural systems; 3 - 5 acres of wetland created or 25-50% additional green space	Alternative results in multi-use natural system development; 5+ acres of wetland or 50%+ additional green space		
Multiple-Use Facilities	Constructed facilities permanently eliminate recreational opportunity	Constructed facilities significantly impair recreational opportunity	Constructed facilities moderately impair recreational opportunity	Constructed facilities have minor impacts on recreational opportunity	Construction temporarily impacts recreational opportunity	No impacts on recreational opportunities	Alternative improves access to existing recreational areas	Alternative has limited positive impact on recreation	Alternative significantly enhances recreational opportunities	Alternative increases recreational opportunities in area	Alternative results in multi-use facility		
Source Control of subwatershed pollutant loads	Pollutant loadings are increased by 50%	Pollutant loadings are increased by 30 - 50%	Pollutant loadings are increased by 15 - 30%	End of pipe pollutant loadings are increased by 0 - 15%	End of pipe pollutant loadings impacts are inconsistent, but likely higher	End of pipe pollutant loadings are unchanged	Pollutant loadings impacts are inconsistent, but likely lower	Source control reduces pollutant loadings by 0 - 15%	Source control reduces pollutant loadings by 15 - 30%	Source control reduces pollutant loadings by 30 - 50%	Source control reduces pollutant loadings by more than 50%		
Non-Obtrusive Construction Techniques	Permanent loss of green space or sensitive area disruption	Main thoroughfare closures, sensitive area temporary disruptions	Widespread dust and noise, blasting, secondary street closures	Localized dust, noise and local street closures	Minor dust and noise, traffic lane closures	No construction impacts	NA	NA	NA	NA	NA		
Consistent Land Use	Intrusive or nuisance facilities inconsistent with neighborhood or land use	Facilities inconsistent with neighborhood or land use	Facility characteristics mitigated to reduce impact on neighborhood	Facilities have significant impact on development density or land use	Facility has minor impact on development density or land use	No impact on land use or no above ground facilities	Alternative mitigates existing compatibility problem	Alternative removes facility inconsistent with neighborhood	Alternative removes nuisance facility from neighborhood	Alternative enhances property values in neighborhood	Alternative provides enhancements that significantly improve neighborhood		
Impermeable Surfaces	5 acres+ of impermeable surfaces are added	3 - 5 acres of impermeable surfaces are added	1 - 3 acres of impermeable surfaces are added	up to 1 acre of impermeable surfaces are added	Minor increase in impermeable surfaces added	No change in impermeable surface	Minor reduction in impermeable surfaces	Up to 1 acre of impermeable surfaces removed	1 - 3 acres of impermeable surfaces removed	3 - 5 acres of impermeable surfaces removed	More than 5 acres of impermeable surfaces removed		
LEEDS Performance	NA	NA	NA	NA	NA	LEEDS not applicable or LEEDS score <10	LEEDS Score 10 - 25	LEEDS Certified	LEEDS Silver	LEEDS Gold	LEEDS Platinum		

Instructions: (1.) Score each alternative for each of the eight aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "fatal flaw". Alternatives that score in this area should not be proposed.

Total Raw Score Calculated	
Total Score (Default)	-2

Note: The total score calculated may be more than 25. In the instances where this might occur, a default maximum score of 25 will be calculated.

Aspect	Rationale	Measurement Method
Non-Renewable Energy Consumption	Eco-friendly solutions would be expected to be low consumers of non-renewable energy. Benchmarking energy consumption against conventional secondary treatment provides penalty points for high energy consuming alternatives.	Evaluation of primary energy consumed per MG of flow treated, compared to the energy consumed at the WCWTP per MG treated.
Use of Natural Systems	Natural systems replace concrete and steel construction with wet bottom storage lagoons, constructed bioswales, rain gardens, etc. that increase green space of various kinds. Options that reduce wetlands and green space get penalty points.	Acres of wetlands and other types of green space created or eliminated. Also includes subjective evaluation of the "basis" of the alternative - "green" or "grey".
Multiple-Use Facilities	Eco-friendly solutions create recreational opportunities for both water-based and riparian recreation. Boating, canoeing, kayaking, fishing, wading, swimming etc. would be direct water-based recreation. Bird watching, hiking, biking, picnicing, camping etc. would be considered related riparian recreation.	Subjective evaluation of changes predicted in the aquatic or riparian environment as a result of better water quality, increased base flow or increased flow peaks, increased tree cover or vegetated riparian areas etc.
Source Control of subwatershed pollutant loads	Controlling pollutant loads at the source through behavior modification, product replacement or stormwater management BMPs that capture pollutants thereby avoiding end of pipe treatment requirements.	Modeled land side pollutant loading reductions as calculated by the BGC Water Quality Tool or by comparison to literature values or pilot program measurements.
Non-Obtrusive Construction Techniques	Probable construction impacts on traffic, noise and dust are all measures of the friendliness of an alternative. Construction impacts get penalty points for creating nuisance conditions.	Subjective evaluation of probable construction impacts based on the type of construction envisioned for the alternative.
Consistent Land Use	Alternative configuration can either enhance or detract from the surrounding property. For example, an extremely unfriendly pump station can be noisy, smelly, and ugly. The same pump station can be "disguised" as a residence that fits right in with the neighborhood. If a larger parcel of land is available, a pump station can be hidden from view by landscaping, and a community garden or other green space added to enhance the neighborhood.	At the planning level, projects can be defined to avoid negative impacts on the surrounding properties. Depending on the availability of land, enhancements are possible. This aspect encourages project definition and budgets to enhance, not detract.
Impermeable Surfaces	Adding impermeable surfaces increases total runoff volume, peak runoff flowrates, and the total transport of any pollutant deposited on the surface from any source. Conversely, permeable surfaces can reduce flow volume and peaks, and provide filtering mechanisms for pollutants.	Acres of permeable surfaces created or eliminated.
LEEDS Performance	LEED standards are applicable to alternatives that include above-ground building structures.	Application of LEED evaluation points.

Acronyms
BGC - Beargrass Creek
LEEDS - Leadership in Energy and Environmental Design
MG - million gallons
WCWTP - West County Wastewater Treatment Plant

MSD
Louisville & Jefferson County
Metropolitan Sewer District

MSD SSS Initial Solutions Development Summary Sheet DRAFT

PROJECT WIN

DOCUMENTED SSO IDS: 00746, MSD0057

MOP IDS: 00735

SEWERSHED AREA: MIDDLE FORK

NETWORK BRANCH ID: MF # 6

OVERFLOW VOLUMES (MG)				
SSO ID	6-Month	1-Year	2-Year	5-Year
00746			0.58	
MSD 0057			0.13	
00735			0.06	

Cause(s) of Overflow: Both pump stations are not large enough to convey the excess wet weather discharges from this area. Overflow occurs by gravity out of rim of wet well and/or manhole.

Surrounding Area Land Use Description: The area surrounding both lots is residential with lot sizes of approximately 1 acre or less.

Apparent Utilities or Other Items in Vicinity: Not yet reviewed.

Proposed Developments in Vicinity?: The area is built-out, and no new developments are currently proposed according to LOJIC.

Capital Projects: There is an assessment project with no year associated with it yet. This project could potentially be used to divert the pump stations to the new collection system.

Modeling Needs: No additional modeling needs at this time.

Alternatives

Storage Alternative: Storage around Anchor Estates 1 would be approximately 1,000 LF of large diameter pipe. It is an option, but could definitely lead to maintenance concerns. At Anchor Estates 2, there is a large lot which potentially has storage capability nearby.

Conveyance Alternative: To create sufficient conveyance at Anchor Estates 1 would require n upgrade to the wet well, pump station and approximately 1,500 LF of force main. To create conveyance at Anchor Estates 2 would require the upsizing of the wet well and pump station. The 6" force main has sufficient capacity

Diversion Alternatives: The best diversion option appears to be the construction of 7,500 LF of pipe to connect to the 24" interceptor at Dorsey and Shelbyville Road. This will only be analyzed if the system downstream of the existing force main is insufficient for the increased flow.

Other Alternatives: No other alternatives are currently proposed.

MSD
Louisville & Jefferson County
Metropolitan Sewer District

MSD SSS Initial Solutions Development Summary Sheet DRAFT

PROJECT WIN

DOCUMENTED SSO IDS: 01106 (VANNAH WAY)

MOP IDS:

SEWERSHED AREA: MIDDLE FORK

NETWORK BRANCH ID: MF # 6

OVERFLOW VOLUMES (MG)				
SSO ID	6-Month	1-Year	2-Year	5-Year
01106			0.01	

Cause(s) of Overflow: Vannah Way pump station is not large enough to convey the excess wet weather discharges from this area. Overflow occurs at a 6" gravity bypass line into the storm sewer line. Peak bypass rate for a 2-year storm is .05 MGD.

Surrounding Area Land Use Description: The SSO is surrounded on all sides by an R-4 residential subdivision.

Apparent Utilities or Other Items in Vicinity: Not yet reviewed.

Proposed Developments in Vicinity?: Not yet reviewed.

Capital Projects: Does not affect solutions for this SSO.

Modeling Needs: Pumping Rate is set as fixed based on design pumping rate of 0.02 MGD. Drawdown data is needed and has been requested.

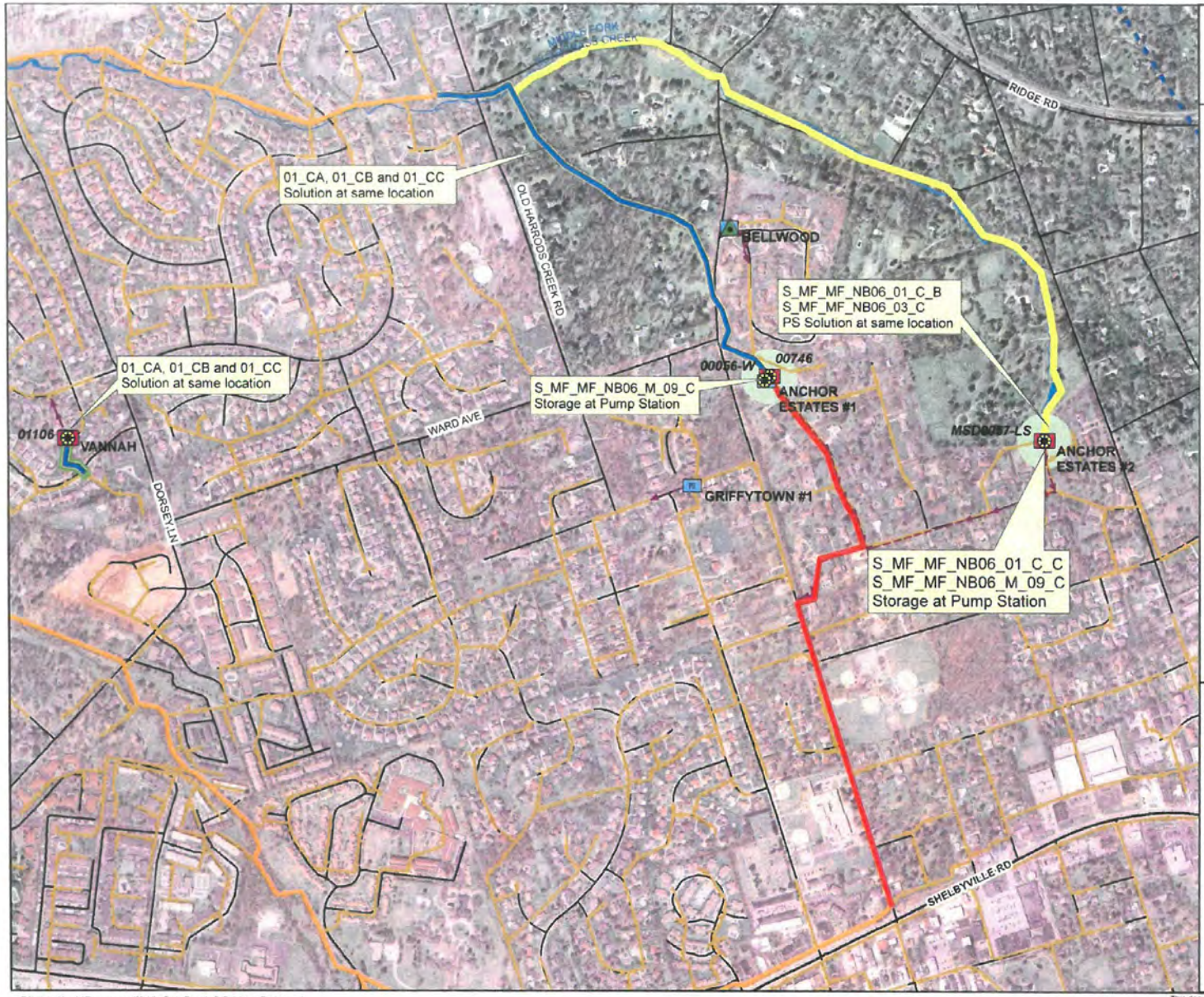
Alternatives

Storage Alternative: The existing SSO is located in the middle of an existing cul-de-sac. Any underground storage would require approximately 50 L.F. of large diameter pipe.

Conveyance Alternative: Upgrades to the pump station is all that is required to convey peak overflow.

Diversion Alternatives: The pump station could be eliminated by installing approximately 400 L.F. of 8-inch gravity line to an existing 8-inch gravity sewer to the south.

Other Alternatives:



Integrated Overflow Abatement Plan
Vol. 3 Sanitary Sewer Discharge Plan
Middle Fork Sewershed

Branch 6 Solutions

Legend

- streetcl arc
- Documented SSO
- Haul-op SSO
- Suspected SSO
- WWTP
- Pump Station
- s_mi_mf_nb06_03_c
- Collector Pipe < 12 "
- Interceptor Pipe => 12"
- Force Main
- s_mi_mf_nb06_01_c_a_cndt
- s_mi_mf_nb06_01_c_c_cndt
- s_mi_mf_nb06_03_c_cndt
- s_mi_mf_nb06_09_c_cndt
- Small WWTP Service Area
- Large WWTP Service Area
- s_mf_mf_nb06_m_09_c
- Middle_Fork_Network_Branch
- County Boundary
- Interstate
- Major Road
- Streams

DRAFT - Not for release

0 350 700 Feet

Map Locator

Some boundaries are uniquely symbolized within each map

Map Revision: June 2008

Aerial Date: 2006

N

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This document was developed in color. Reproduction on black and white may not represent the data as intended

DRAFT Modeled 2-yr Solutions Summary

CURRENT PREFERRED SOLUTION

Watershed/Geo-graphic Region	Main SSO or Branch ID	Project or Cost Sheet Name	Documented and Suspected SSOs Addressed	Solution Technology	Project Description	Weighted Benefit/ Cost Ratio (Capital Costs)	Weighted Benefit/Cost Ratio (Total Present Worth Costs)
Cedar Creek	70158	S_CC_CC_70158_M_09A_C	70158, 28998, 28984, 63094, 63095	Storage	In-line storage with 96" pipe to store wet weather peak flow	7.67	9.77
Cedar Creek	70158	S_CC_CC_70158_S_01_C	70158, 28998, 28984, 63094, 63095	Conveyance	Upsize interceptor pipes in the area	5.51	6.94
Cedar Creek	81316	S_FF_CC_81316_M_09A_C	81316, 97362	Storage	Upsize influent lines with 48" pipe to create upstream in-line Storage	16.33	20.80
Cedar Creek	81316	S_FF_CC_81316_M_03_C	81316, 97362	Conveyance	PS upgrades	2.85	2.61
Cedar Creek	67997	S_CC_CC_67997_M_01_C	89178, 67997, 67999, 86423, 89195, 89197	Conveyance	Upsize interceptor pipe in the area	4.44	5.56
Floyds Fork	NB01	S_FF_FF_NB01_S_01_C_A	43538	Diversion	Lower overflow pipe invert to divert wet weather flows to Woodland Hills PS	276.77	73.81
Floyds Fork	NB01	S_FF_FF_NB01_S_03_C_A	43538	Conveyance	1,650 LF of pipe upgrades from 15" to 18"	11.05	13.86
Floyds Fork	NB01	S_FF_FF_NB01_S_09A_C_A	43538	Storage	In-line storage with 400 LF and 110 LF 48" pipes	11.00	13.95
Floyds Fork	NB02	S_FF_FF_NB02_S_09A_C_A	48464	Storage	In-line storage with 50 LF of 48" pipe	305.02	383.22
Floyds Fork	NB02	S_FF_FF_NB02_S_03_C_A	48464	Conveyance	Upgrade both pumps in the Eden Care PS to discharge 115 GPM	17.85	17.53
Floyds Fork	NB03	S_FF_FF_NB03_M_01_C_A	43504, 43563	Diversion	Divert flow from Ashburton PS by upgrading FM and adding gravity sewer (also eliminates the SSO at Olde Copper Ct PS)	150.66	161.00
Floyds Fork	NB03	S_FF_FF_NB03_M_03_C_B	43504, 43563	Conveyance	Upgrade FM for Olde Copper Ct PS and for Ashburton PS (will pass additional flow to Old Copper Ct PS)	111.57	106.61
Floyds Fork	NB03	S_FF_FF_NB03_M_HB_C_C	43504, 43563	Diversion & Conveyance	Remove Olde Copper Ct PS, use gravity sewer to divert flow to another part of the system, and upgrade FM for Ashburton PS	86.27	91.31
Floyds Fork	NB03	S_FF_FF_NB03_M_HB_C_A	43504, 43563	Conveyance & Storage	In-line storage with 320 LF of 42" pipe with a drop shaft, and upgrade FM for Ashburton PS	52.51	59.44
Floyds Fork	NB03	S_FF_FF_NB03_M_HB_C_B	43504, 43563	Conveyance & Storage	In-line storage with 150 LF of 60" pipe with a drop shaft upstream of Olde Copper Ct PS, upgrade FM for Ashburton PS	51.19	58.40
Floyds Fork	NB03	S_FF_FF_NB03_M_03_C_A	43504, 43563	Conveyance	Upgrade pumps in Olde Copper Ct PS, upgrade FM for the Ashburton PS (will pass additional flow to Old Copper Ct PS)	47.82	42.51
Floyds Fork	NB03	S_FF_FF_NB03_M_03_C_C	43504, 43563	Conveyance	Upgrade existing wet well and pumps at Olde Copper Ct PS, and upgrade FM for Ashburton PS	27.03	27.73
Hite Creek	MSD1082	S_CC_HC_MSD1082_S_09A_C	MSD1082, MSD1095-PS	Storage	Underground storage in line with the current influent line to the PS consisting of 476 LF of 10" pipes or another underground solution with equivalent capacity	9.43	12.06
Hite Creek	MSD1082	S_CC_HC_MSD1082_S_09B_C	MSD1082, MSD1095-PS	Storage	Above ground storage vault for off-line storage	8.69	8.57
Hite Creek	MSD1082	S_HC_HC_MSD1082_S_03_C	MSD1082, MSD1095-PS	Conveyance	Upgrade Meadow Stream PS to handle peak flows of approximately 4.5 MGD	3.19	2.81
Hite Creek	MSD1086	S_CC_HC_MSD1086_M_07_C_B	MSD1085, MSD1086, 90776, 108956	Conveyance	Inflow and Infiltration reduction by slip lining the suspected problem area south of the PS and near the PS drainage ditch	61.65	60.38
Hite Creek	MSD1086	S_CC_HC_MSD1086_M_07_C_A	MSD1085, MSD1086, 90776, 108956	Conveyance	Inflow and Infiltration reduction by slip lining the entire sewershed contributing to the PS	24.98	24.30
Hite Creek	MSD1086	S_CC_HC_MSD1086_M_03_C	MSD1085, MSD1086, 90776, 108956	Conveyance	Upgrade PS and FM to handle peak flow after buildout	22.10	22.12
Hite Creek	MSD1086	S_CC_HC_MSD1086_M_09A_C	MSD1085, MSD1086, 90776, 108956	Storage	In-Line storage	19.50	24.80
Hite Creek	MSD1085	S_CC_HC_MSD1085_S_03_C	MSD1085	Conveyance	Upgrade PS to handle peak flow after buildout	12.29	12.48
Hite Creek	MSD1086	S_CC_HC_CrestwoodPS_M_13_C	MSD1085, MSD1086, 90776, 108956	Conveyance	Take Floydsburg Road PS and Kavanaugh Road PS off line, construct interceptors to run south to a new regional PS to serve the whole Crestwood area, and construct a FM parallel to Floydsburg Road Interceptor	7.14	8.15
Hite Creek	MSD1085	S_CC_HC_MSD1085_S_09A_C	MSD1085	Storage	In-line overflow storage with the two PS influent lines	5.25	6.71
Jeffersontown	NB01	S_JT_JT_NB01_01_C	MSD0255, ISO28, 64505, 28391, 28392, 31733, 28395A	Diversion & Storage	Relief sewer from Grassland to the WWTP, storage at the plant and PS, FM installed to the BGI, some tunneling required	3.04	3.30
Jeffersontown	NB01	S_JT_JT_NB01_09_C	MSD0255, ISO28, 64505, 28391, 28392, 31733, 28395A	Diversion & Storage	Storage at Grassland and at the plant and PS, and a FM installed to the BGI	2.46	2.65
Jeffersontown	NB01	S_JT_JT_NB01_03_C	MSD0255, ISO28, 64505, 28391, 28392, 31733, 28395A	Conveyance	Wet weather PS at Grassland, storage and PS at the plant, and a FM installed from plant to the BGI	2.39	2.61

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Jeffersontown	NB02	S_JT_JT_NB02_01_C	98564, 28413, 28414, 28415, 28250, 28249, 28340, 28336, 99649	Conveyance	Upsizing pipe downstream of Charlane and Dell Road overflows, some tunneling required	39.48	49.40
Jeffersontown	NB02	S_JT_JT_NB02_09_C	98564, 28413, 28414, 28415, 28250, 28249, 28340, 28336, 99649	Storage	Underground off-line storage at Jeffersontown Swimming Pool and alongside manhole 103647	22.22	23.21
Jeffersontown	NB03	S_JT_JT_NB03_01_C	MSD0148-PS, MSD0149-PS, 28719, 28711	Diversion	Install 450 LF from Marion PS and 350 LF from Raintree PS to divert flows to the SED, also conveyance for overflow 25676	114.80	137.37
Jeffersontown	NB03	S_JT_JT_NB03_09_C	MSD0148-PS, MSD0149-PS, 28719, 28711	Conveyance & Storage	Underground off-line storage for Marion Ct PS, replace FM and pumps for Raintree PS, upsize gravity sewer downstream of FM	27.78	29.83
Jeffersontown	NB03	S_JT_JT_NB03_03_C	MSD0148-PS, MSD0149-PS, 28719, 28711	Conveyance	Replace FM for Raintree, replace pumps at Marion Ct PS and Raintree PS, and upsize gravity sewer downstream of the FM	25.51	27.31
Jeffersontown	NB04	S_JT_JT_NB04_09_C	29040, 64096, 86052	Storage	Off-line storage for MSD0196 and MSD0151	22.86	22.66
Jeffersontown	NB04	S_JT_JT_NB04_03_C	29040, 64096, 86052	Conveyance	Install 8,500 LF of FM for Chenoweth Run only (abandon but do not remove existing FM so it could be used later), replace pumps at Chenoweth Run PS and Monticello PS	20.99	17.36
Middle Fork	MF01	S_MISF_MF_NB01_M_01_C_A2	IS021, 08934SM, 47583, 02937, 02933, 47596, 45385,27005,23211	Diversion & Storage	Divert Upper Middle Fork PS to Hikes Lane Interceptor using existing pumps, open storage at Buechel Basin, covered storage at Breck Car Wash Lot, and upsize pipe downstream of 15138	1.27	1.37
Middle Fork	MF01	S_MISF_MF_NB01_M_01_C_A1	IS021, 08934SM, 47583, 02937, 02933, 47596, 45385, 27005, 23211	Storage	Divert Upper Middle Fork PS to Hikes Lane Interceptor using existing pumps, open storage at Buechel Basin, covered storage at Breck Car Wash Lot, upsize pipe downstream of 15138, and construct relief Middle Fork Interceptor sections	1.22	1.33
Middle Fork	MF01	S_MISF_MF_NB01_M_01_C_A3	IS021, 08934SM, 47583, 02937, 02933, 47596, 45385,27005,23211	Diversion & Storage	Divert Upper Middle Fork PS to Hikes Lane Interceptor using existing pumps, open storage at Buechel Basin, covered storage at Cannons Lane site, upsize pipe downstream of 15138, and construct relief Middle Fork Interceptor sections	1.22	1.33
Middle Fork	MF01	S_MISF_MF_NB01_M_01_C_B1	IS021, 08934SM, 47583, 02937, 02933, 47596, 45385,27005,23211	Diversion & Storage	Divert all necessary flow through Upper Middle Fork PS to Hikes Lane Interceptor by upgrading PS, open storage at Buechel Basin, upsize pipe downstream of 15138, and construct relief Middle Fork Interceptor sections	0.99	1.09
Middle Fork	MF01	S_MISF_MF_NB01_09B_C_A2	IS021, 08934SM, 47583, 02937, 02933, 47596, 45385,27005,23211	Diversion & Storage	No Upper Middle Fork PS diversion, small uncovered storage at Buechel Basin, significant covered storage at Oxmoor Mall Site, and upsize pipe downstream of 15138	0.81	0.89
Middle Fork	MF01	S_MISF_MF_NB01_09B_C_A1	IS021, 08934SM, 47583, 02937, 02933, 47596, 45385,27005,23211	Diversion & Storage	No Upper Middle Fork PS diversion to Hikes Lane, small open storage at Buechel Basin, large covered storage at Breck Car Wash Lot, upsize pipe downstream of 15138, and construct relief Middle Fork Interceptor sections	0.78	0.85
Middle Fork	MF04	S_MI_MF_NB04_03_C	21628-W, 46891, 91629, 91630	Conveyance	Upgrade Devondale PS, also upsize downstream FM and a significant amount of the downstream collectors and interceptors	Solution currently being evaluated at the 5-year design level.	
Middle Fork	MF04	S_MI_MF_NB04_09B_C	21628-W, 46891, 91629, 91630	Storage	Off-line storage near the Devondale PS	Solution currently being evaluated at the 5-year design level.	
Middle Fork	MF06	S_MI_MF_M_NB06_01_C_C	00746, MSD0057, 01106	Diversion & Storage	Two diversion gravity pipes, and storage at MSD0057-PS	32.26	39.83
Middle Fork	MF06	S_MI_MF_NB06_M_01_C_A	00746, MSD0057, 01106	Diversion	Three diversion gravity pipes (one at MSD0057)	20.86	25.39
Middle Fork	MF06	S_MI_MF_NB06_M_09_C	00746, MSD0057, 01106	Storage	Diversion at 01106, storage in 150 LF (at MSD0057) and 300 LF (at 00746) 72" pipe	27.70	35.42
Middle Fork	MF06	S_MI_MF_NB06_M_01_C_B	00746, MSD0057, 01106	Diversion	Two diversion gravity pipes, and MSD0057-PS upgrades with flow diverted to 00746 diversion	20.10	23.05
Middle Fork	MF06	S_MI_MF_NB06_M_03_C	00746, MSD0057, 01106	Conveyance	Upsize PS, increase size of FM, upsize downstream collector	5.34	6.11
Mill Creek	81814-W	S_MC_ALL_Storage and Conveyance SOLN	81814-W, MSD0047-PS, MSD0050-PS	Storage		41.58	51.97
Mill Creek	81814-W	S_MC_ALL_Storage and Conveyance SOLN	81814-W, MSD0047-PS, MSD0050-PS	Conveyance		19.03	23.78

DRAFT Modeled 2-yr Solutions Summary

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ORFM	NB01	S_OR_MF_NB01_01_C	MSD0023-PS, MSD0007-PS, MSD0010-PS, 26752, 41416, 24472	Diversion & Conveyance	Replace approximately 2,000 LF of gravity sewer flowing into MSD0007, upgrade storage at MSD0023, install 400 LF of pipe for Winton diversion and 2,200 LF of pipe for Mockingbird diversion	26.32	31.31
ORFM	NB01	S_OR_MF_NB01_03_C	MSD0023-PS, MSD0007-PS, MSD0010-PS, 26752, 41416, 24472	Conveyance	Replace approximately 2,000 LF of gravity sewer flowing into MSD0007, upgrade pumps at MSD0007 and MSD0010, total PS upgrade of MSD0023, upsize 2,000 LF of FM for MSD0007, and upsize 1,240 LF of FM for MSD0023	23.89	27.89
ORFM	NB01	S_OR_MF_NB01_09_C	MSD0023-PS, MSD0007-PS, MSD0010-PS, 26752, 41416, 24472	Diversion & Storage	Replace approximately 200 LF of gravity sewer flowing into the storage area for MSD0007, divert MSD0010	20.18	21.17
ORFM	NB01	S_OR_MF_NB01_01_C_A	MSD0023-PS, MSD0007-PS, MSD0010-PS, 26752, 41416, 24472	Diversion	Replace approximately 2,000 LF of gravity sewer flowing into MSD0007, total PS upgrade of MSD0023, upsize 1,240 LF of FM for MSD0023, install 400 LF of pipe for Winton diversion and 2,200 LF of pipe for Mockingbird diversion	10.51	11.40
ORFM	NB02	S_OR_MF_NB02_03_B	96020	Conveyance	Relief sewer for Leland Road overflow with 320 LF of pipe	94.45	113.34
ORFM	NB02	S_OR_MF_NB02_09_B	96020	Storage	Off-line storage pumps potentially along the gravity sewer in the rear of some houses along Leland, storage in the area is difficult due to lack of available land	14.20	12.76
ORFM	NB03	S_OR_MF_NB03_09_C_B	MSD0095-PS	Storage	Divert flow to an open area between the edge of pavement of Derington Court and the creek into an off-line storage basin	24.92	24.92
ORFM	NB03	S_OR_MF_NB03_03_C	MSD0095-PS	Conveyance	Upsize pumps in Derington Ct PS and upsize FM	16.24	13.68
ORFM	NB03	S_OR_MF_NB03_09_C_A	MSD0095-PS	Storage	In-line storage by installing 290 LF of 60" pipe parallel to the gravity line running down Derington Ct to Derington Ct PS	14.38	18.35
SED	NB03	S_SD_MF_NB03_09B_C	47250	Storage	Off-line closed storage in open field adjacent to SSO	13.78	13.85
SED	NB03	S_SD_MF_NB03_01_C	47250	Conveyance	2,400 LF of 10" relief sewer that parallels the existing sewer along Rustic Way mainly in the R/W outside of the pavement	9.95	12.32
SED	NB04	S_SD_MF_NB04_09B_C	25676	Storage	Off-line storage in the school property adjacent to the SSO	1.21	1.20
SED	NB04	S_SD_MF_NB04_01_C	25676	Conveyance & Diversion	3,160 LF of 12" relief interceptor but the alignment could change if the Jeffersontown diversion is a gravity interceptor along the South Fork in which case this interceptor would increase to 30"	0.57	0.72
SED	NB05	S_SD_MF_NB05_09B_C	16649, 51594	Storage	Off-line storage in an open field on Atherton High School Property for Sutherland SSO, no solution for 51594	32.41	32.41
SED	NB05	S_SD_MF_NB05_01_C	16649, 51594	Conveyance	Upsize gravity pipe along rear yards to eliminate Sutherland SSO possibly with pipe-bursting, no solution for 51594	27.41	33.71
Berrytown	NB01	S_FF_BT_NB01_S_09A_C_B	MSD0199-LS	Storage	Off-line underground storage basin prior to Lucas Lane LS	101.60	106.29
Berrytown	NB01	S_FF_BT_NB01_S_09A_C_A	MSD0199-LS	Storage & Conveyance	Install 180 LF of 36" pipes that branch off the gravity main prior to the Lucas Lane PS, increase the size of said gravity main	85.34	107.09
Berrytown	NB01	S_FF_BT_NB01_S_03_C_A	MSD0199-LS	Conveyance	Upgrade pumps at PS to have a fixed discharge of 76 GPM	77.46	71.41
Hunting Creek North	NB01	S_HC_HN_NB01_S_09A_C_A	43750	Storage & Conveyance	In-line storage with 30" pipe off gravity main prior to the Riding Ridge LS, and increase the gravity main	21.57	27.45
Hunting Creek North	NB01	S_HC_HN_NB01_S_03_C_A	43750	Conveyance	Upgrade pumps at Riding Ridge PS to 24 GPM	36.81	28.22
Hunting Creek North	NB01	S_HC_HN_NB01_S_03_C_B	43750	Conveyance	Increase FM size leaving Riding Ridge PS	24.95	24.12
Hunting Creek North	NB02	S_HC_HN_NB02_S_09A_C_B	43411	Storage	install 185 LF of 48" in-line storage pipe	72.20	92.26
Hunting Creek North	NB02	S_HC_HN_NB02_S_09A_C_A	43411	Storage	install 120 LF of 60" in-line storage pipe	55.15	70.17
Hunting Creek North	NB02	S_HC_HN_NB02_S_03_C_A	43411	Conveyance	Upgrade pumps, wet well, and FM at the Gunpowder PS	8.87	9.09
Hunting Creek South	NB01	S_HC_HS_NB01_S_09A_C_B	43512	Storage	Install an off-line storage basin prior to Fairway View PS	47.40	54.96
Hunting Creek South	NB01	S_HC_HS_NB01_S_09A_C_A	43512	Storage	Replace first two segments of gravity sewer north and east of the Fairway View PS with in-line storage pipe, and new pipe entrances for the larger pipe diameters	25.58	32.05
Hunting Creek South	NB01	S_HC_HS_NB01_S_03_C_A	43512	Conveyance	Upgrade pumps at PS to discharge 95 GPM	17.31	16.28
Hunting Creek South	NB01	S_HC_HS_NB01_S_13_C_A	43512	Conveyance	Upgrade pumps to 95 Gem, upsize north and east gravity sewers upstream of PS, and new pipe entrances drilled into wet well for the larger pipe diameters	10.25	10.20
Hunting Creek South	NB02	S_HC_HS_NB02_S_09A_C_A	16222	Storage	Replace two gravity sewers immediately upstream of the Deep Creek Lift Station with a 150 LF-36" and a 170 LF-30" pipe respectively for in-line storage	61.96	78.33
Hunting Creek South	NB02	S_HC_HS_NB02_S_13_C_A	16222	Conveyance	Upgrade pumps and replace the 8" gravity sewer immediately upstream of the LS with a 36" pipe	22.91	23.13
Hunting Creek South	NB02	S_HC_HS_NB02_S_03_C_A	16222	Conveyance	Replace lift station with a larger lift station	7.89	8.79

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Lake Forest	NB01	S_FF_LF_NB01_S_09A_C_D	43614	Storage	Install 65 LF of 60" pipes for in-line storage east of the Lift Station, and replace 8" sewer south of that with a 36" pipe	59.31	75.48
Lake Forest	NB01	S_FF_LF_NB01_S_09A_C_A	43614	Storage	Upgrade gravity mains on both sides of the Lake Forest Lift Station with 130 LF of 36" pipe for in-line storage, also replace 180 LF with 42" pipe	43.13	54.90
Lake Forest	NB01	S_FF_LF_NB01_S_13_C_A	43614	Diversion & Storage	Divert flow from 88655 to 80472, and upgrade 8" sewer immediately upstream (and west) of Lift Station with a 85 LF 38" pipe	30.44	37.59
Lake Forest	NB01	S_FF_LF_NB01_S_03_C_A	43614	Conveyance	Upgrade pumps at the Lake Forest LS to discharge 118 GPM	30.46	29.04
Pond Creek	PC02	S_PO_WC_PC02_M_0109B_C	MSD0143-PS	Conveyance & Storage	Open off-line storage at Park Ridge Woods with gravity operated connection to wet well, upsize downstream to eliminate excess surcharging	4.51	5.31
Pond Creek	PC02	S_PO_WC_PC02_M_010309B_C	MSD0143-PS	Conveyance & Storage	Open off-line storage (large wet well) at Park Ridge Woods with pump connection, some PS upgrades, and upsizing downstream	3.42	4.08
Pond Creek	PC02	S_PO_WC_PC02_M_0103_C	MSD0143-PS	Conveyance	Upgrade Park Ridge Woods PS, upgrade sewers and FM upstream of Park Ridge, and upsize downstream to eliminate excess surcharging	2.67	3.33
Pond Creek	PC03	S_PO_WC_PC03_M_01_C	25480	Diversion	Charleswood Subdivision Interceptor will possibly eliminate Cooper Chapel PS, upsize pipes downstream	10.74	13.54
Pond Creek	PC04	S_PO_WC_PC04_M_03_C	MSD1013-PS, 35308, 35309	Conveyance	Upgrade Cinderella PS	148.01	152.64
Pond Creek	PC04	S_PO_WC_PC04_M_0309B_C	MSD1013-PS, 35308, 35309	Storage	Off-line pumped open storage basin at Cinderella PS	63.78	60.21
Pond Creek	PC04	S_PO_WC_PC04_M_0109B_C	MSD1013-PS, 35308, 35309	Storage	Off-line gravity operated open storage basin at Cinderella PS	58.82	57.11
Pond Creek	PC05	S_PO_WC_PC05_M_0109B_C	MSD0101-PS, 25484, 93719	Storage & Conveyance	Upgrade Lantana PS, upgrade FM, and additional conveyance improvements needed to carry flow to the PS and downstream of FM	82.41	68.87
Pond Creek	PC05	S_PO_WC_PC05_M_010309B_C	MSD0101-PS, 25484, 93719	Storage & Conveyance	Pumped open off-line storage (large wet well) at Lantana PS, and conveyance improvements needed to carry flow to the PS	67.70	63.00
Pond Creek	PC05	S_PO_WC_PC05_M_0103_C	MSD0101-PS, 25484, 93719	Conveyance	Upgrade Lantana PS, upgrade FM, and additional conveyance improvements needed to carry flow to the PS and downstream of FM	45.11	49.74
Pond Creek	PC06	S_PO_WC_PC06_M_010309B_C	MSD0180-PS	Storage	Pumped covered off-line storage basin at the Government Center PS, additional gravity improvements required in area	11.84	12.40
Pond Creek	PC06	S_PO_WC_PC06_M_0103_C	MSD0180-PS	Conveyance	Upgrade Government Center PS, replace FM, additional gravity improvements required in area to eliminate excessive surcharging	11.41	12.76
Pond Creek	PC06	S_PO_WC_PC06_M_0109B_C	MSD0180-PS	Storage	Gravity operated off-line covered storage basin at the Government Center PS, additional gravity improvements required in area	10.61	11.36
Pond Creek	PC07	S_PO_WC_PC07_M_0103_C	21229-W	Conveyance	Upgrade Avanti PS, additional gravity improvements required in area	13.07	15.45
Pond Creek	PC07	S_PO_WC_PC07_M_0109B_C	21229-W	Storage	Open off-line gravity storage basin (large wet well) at Avanti PS connected to wet well, some downstream improvement required to eliminate surcharging	12.31	13.28
Pond Creek	PC07	S_PO_WC_PC07_M_0309B_C	21229-W	Storage	Pumped open off-line storage (large wet well) at Avanti PS connected to existing wet well, assumed small structure needed for connection pumps band partial sharing of Avanti assets	10.26	11.49
Pond Creek	PC08	S_PO_WC_PC08_M_0103_C	19369, 29933, 29943, 31083, 31084, 57874, 74846, 79076, 102675	Conveyance	Restore Lea Ann Way PS to 22 MGD capacity, some upstream improvements needed to eliminate excess surcharging	12.03	12.70
Pond Creek	PC08	S_PO_WC_PC08_M_0109B_C	19369, 29933, 29943, 31083, 31084, 57874, 74846, 79076, 102675	Storage & Conveyance	Gravity operated off-line storage basin at Lea Ann Way PS, some upstream improvements needed to eliminate excess surcharging, some clear and grubbing may be needed in sewers behind houses	11.45	12.83
Pond Creek	PC08	S_PO_WC_PC08_M_0309B_C	19369, 29933, 29943, 31083, 31084, 57874, 74846, 79076, 102675	Storage & Conveyance	Off-line storage basin at Lea Ann Way PS operated by pumping, some clear and grubbing may be needed in sewers behind houses	11.28	12.55
Pond Creek	PC09	S_PO_WC_PC09_M0109B_C	27116, 61732, 70212, 35410, 35414	Storage & Conveyance	Off-line gravity storage at Caven Avenue PS behind the Meijer on Preston Highway near South Park PS, additional improvements needed	5.46	6.06
Pond Creek	PC09	S_PO_WC_PC09_M0309B_C	27116, 61732, 70212, 35410, 35414	Storage & Conveyance	Off-line pumped storage at Caven Avenue PS and near the Meijer on Preston Highway to alleviate overflows and excessive surcharging	3.79	4.37
Pond Creek	PC09	S_PO_WC_PC09_M_0103_C	27116, 61732, 70212, 35410, 35414	Conveyance	Upsize Caven Avenue PS, additional gravity pipes in Okolona area, upsize Caven FM	2.73	3.41

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Pond Creek	PC10	S_PO_WC_PC10_M_0109B_C	36419, 55290, 57973	Storage	Add gravity operated off-line storage to small pump stations (Francell, Leven, Sunlight, and Waycross) to alleviate surcharging, and gravity basin in the Jefferson Mall area	5.92	6.86
Pond Creek	PC10	S_PO_WC_PC10_M_0309B_C	36419, 55290, 57973	Storage	Add pumped operated off-line storage to small pump stations (Francell, Leven, Sunlight, and Waycross) to alleviate surcharging, and stand-alone storage in in the Jefferson Mall area	5.04	5.90
Pond Creek	PC10	S_PO_WC_PC10_M_0103_C	36419, 55290, 57973	Conveyance	Upgrade Sunlight PS, Leven PS, Francell PS, and Waycross PS in downstream system to alleviate surcharging and overflows	3.13	3.82
CSO	42007	S_OR_MF_42007_01_CV	42007	Conveyance	Expand wet well in the PS and increase pumping capacity	245.14	153.90
CSO	42007	S_OR_MF_42007_01_ST	42007	Storage	Off-line storage basin to store excess wet weather flows	33.03	26.26
CSO	30917	S_SF_MF_30917_01_CV_A	30917, 31284, 31226	Conveyance	Replace 44,000 LF of sanitary sewer system	2.38	3.00
CSO	30917	S_SF_MF_30917_01_ST	30917, 31284, 31226	Storage	Off-line storage basin to store excess wet weather flows	41.25	41.48

***SSOs eliminated by projects considered part of the baseline conditions are not included in this spreadsheet.**

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DRAFT ***Middle Fork Network Branch 6 / Floyds Fork Network Branch 1 - SSO Characteristics***

SSO ID	SSO NAME	FACILITY TYPE	OVERFLOW CATEGORY	OVERFLOW TYPE	DISCHARGE TO	RECEIVING STREAM	SERVICE AREA	WATERSHED	MODEL REGION	AVG ANNUAL OVERFLOW VOLUME (MG/Y)	NUMBER OF OVERFLOW INCIDENTS (NO PER YR)	AVG VOLUME PER INCIDENT (GALLONS)	AVG DURATION OF OVERFLOW (HOURS)	MINIMUM RAINFALL AMOUNT (IN)
00748	Anchor Estates #1	Pump Station	Documented	Pumped	Ditch	Middle Fork	Morris Forman	Middle Fork	Middle Fork	220,732	27.6	8,000		0.18
01106	Foxboro Dr / End of St	Pump Station	Documented	Bypass	Catch Basin	Middle Fork	Morris Forman	Middle Fork	Middle Fork		1.7	No Data		2.30
MSD0057-LS	Anchor Estates #2	Pump Station	Documented	Capacity	Stream	Middle Fork	Morris Forman	Middle Fork	Middle Fork	279,334	31.0	9,000		0.09
65531	12400 Brierly Hill Rd	Manhole	Validated Modeled Overflow Point	Capacity	Ditch	Pope Lick	Floyds Fork	Floyds Fork	Floyds Fork	8,000	0.5	16,000		1.82

MSD
Louisville / Jefferson County Metropolitan Sewer District

SSO SSDP
Modeled Solutions
Project Fact Sheet

PROJECT WIN
Waterway Improvements Now

SSO Project Number: S_MI_MF_NB06_01_C_A

Modeled Area: Middle Fork

Branch or SSO ID: MF06

Project Type: Diversion

Receiving Stream: Middle Fork

Project Description: This alternative includes a diversion for 01106 with Gravity Pipe, a diversion for 00746 with Gravity Pipe, and a diversion for MSD0057 with Gravity Pipe.

Reason for Overflow: Bypass Pipe at Vannah Way, Undersized Pumps at Anchor Estates # 1 and # 2.

Design Parameters / Assumptions: This solution is based on a 2 year - 3 hour rain event

Project Constraints: None at this time

Estimated Capital Cost (2010 dollars): $3,011,144

Weighted Benefit/Cost Ratio (Capital Cost): 20.86

Overflow Points Addressed:

SSO	SSO Name	Service Area	Overflow Type	Discharge To	Average Overflow / Incident (gallons)	Number of Overflow/ Yr
00746	Anchor Estates # 1 PS	Morris Forman	Pumped	Ditch	8,023	27.6
MSD0057	Anchor Estates # 2 PS	Morris Forman	Capacity	Stream	9,183	31.0
01106	Foxboro Dr / End of St PS	Morris Forman	Bypass	Catchbasin	No Data	1.7

Project Cost Summary Sheet

Project ID: S_MI_MF_NB06_M_01_C_A

Description: Diversion for 01106 with Gravity Pipe, Diversion for 00746 with Gravity Pipe, Diversion for MSD0057 with Gravity Pipe

Estimate Date: 5/16/2008

Prepared By: Bill Sanders, P.E. Heritage Engineering

Printed Date: 6/18/2008

Cost Estimate Description		Totals
Estimated Open Cut Sewer Construction Cost	$	1,649,000
Estimated Tunneling Construction Cost	$	-
Estimated Off-line Storage Facilities Construction Cost	$	-
Estimated I/I Removal Cost	$	-
Estimated Pump Station Cost	$	-
Estimated Flow Control Structure	$	-
Estimated Earthen Basin Cost	$	-
Estimated Force Main Cost	$	-
Estimated High Rate Treatment Cost	$	-
Estimated Screening Cost	$	-
Misc. Extra Cost Description:	$	-
Total Estimated Construction Cost =	**$**	**1,649,000**

Real Estate Costs Description				Totals
Easement Cost	# of Properties =	23	$	44,827
Property Acquisition			$	-
Misc. Extra Cost Description:			$	-
Total Additional Costs =			**$**	**45,000**

Multipliers Description	Multiplier
Administration Costs	4%
Contingencies	25%
Interest	6%
Miscellaneous	9%
Engineering & Inspection	8%
Design Services	5%
Program Management	4%
Planning & Preliminary Design	2%
Performance Bond	1%
Total Multipliers =	**64%**

Data File Base ENRCCI	7312	**PROJECT CAPITAL COST ESTIMATE =**	$	2,778,000
Data File ENRCCI in use	7888	**Project 20 Year Present Worth Estimate =**	$	2,282,000

For Economy of Scale when dealing with the facility worksheets for a facility whose size is far greater than the largest available on the curve use the following Economy of Scale equation to adjust the cost and enter the adjustment in the Misc. Extra Cost: (Professional Engineering judgement to be used for decision to use this adjustment.)

$$C = Cr (Qc / Qr) ^ m$$

Cr = cost from tool at maximum size for facility cost curve

Qc = design size

Qr = maximum size for facility from cost curve

C = cost for design size Qc

m = correlation exponent (0 < m < 1) Use 0.6 for all structures.

EXAMPLE: For a BF facility of 500 MGD where 100 is the maximum size on the curve use.

C = $41,686,164 * (500 / 100) ^ 0.6	=	$	109,489,869
C500 from Tool	=	$	208,281,000
Difference (C - C500)	=	**$**	**(98,791,131)**

Enter the Difference as a negative value in the Misc. Extra Cost row and enter in Economy of Scale Adjustment in the Description.

Benefit/Cost Model Cost Data		
Capital Cost	$	3,011,144
Total Present Worth	$	2,473,517

MSD

ENRCCI overwrite by Estimator: 8550

PROJECT CAPITAL COST ESTIMATE =	**$ 3,011,144**
Project 20 Year Present Worth Estimate =	**$ 2,473,517**
Construction Cost Estimate =	**$ 1,836,169**

Project Values Summary Sheet

Value Description	Totals
Length of Open Cut Sewer Conveyance (Feet)	9,790
Length of Tunnel Sewer Conveyance (Feet)	0
Off-line Storage Annual Volume Stored (Million Gallons)	0
Off-line Storage Estimated # of Annual Occurrence	0
Flow Control Structure Annual Volume Stored (Million Gallons)	0
Flow Control Structure Estimated # of Annual Occurrence	0
Earthen Basin Annual Volume Stored (Million Gallons)	0
Earthen Basin Estimated # of Annual Occurrence	0
Annual Volume of Pumping (Million Gallons)	0
Estimated Total Dynamic Head of Pumping (Feet)	0
Length of Force Main Conveyance (Feet)	0
Annual Volume of High Rate Treatment (Million Gallons)	0
High Rate Treatment Estimated # of Annual Occurrences	0
Screening Estimated # of Annual Occurrences	0
Screening Annual Volume Disinfected	0

MSD

OPEN CUT SEWER CONSTRUCTION VALUE ENTRY SHEET

Project ID: S_MI_MF_NB06_M_01_C_A

Estimate Date: 5/16/2008

Printed Date: 6/18/2008

Prepared By: Bill Sanders, P.E. Heritage Enginee

Segment ID	*Pipe Size (in)	Length of Pipe in Street (ft)	Length of Pipe out of Street (ft)	**Average Depth (ft)	# of San. Service Laterals	# of Aband'd Inlets	# of New Inlets	# of Water Services Replaced	Street Width (ft)	# of Manholes	# of Diversion Structures	# of Existing MH Surface Rehabs	Small Medium or Large Creek Crossing (S,M, or L)	Sewer in Rock	Dewatering Required	Maintenance of Flow	Brownfields	Clearing and Grubbing	Traffic Maintenance Required	Urban Alignment	Total Cost Per Segment
0057	8	1,500	4,300	5	0	0	0	0	15	15	0	0		x	x			x	x		$ 666,794
0057(XS)	8	0	10	5	0	0	0	0	0	0	0	0	M	x	x			x	x		$ 94,077
0057(XS)	8	0	10	5	0	0	0	0	0	0	0	0	M	x	x			x	x		$ 94,077
0057(XS)	8	0	10	5	0	0	0	0	0	0	0	0	M	x	x			x	x		$ 94,077
0057(XS)	8	0	10	5	0	0	0	0	0	0	0	0	M	x	x			x	x		$ 94,077
00746-1	8	400	0	5	0	0	0	1	20	2	0	0		x							$ 125,039
00746-2	8	0	2,500	5	0	0	0	0	0	8	0	0		x				x			$ 152,420
00746(XS)	8	0	10	5	0	0	0	0	0	0	0	0	S	x	x			x			$ 25,141
00746(XS)	8	0	10	5	0	0	0	0	0	0	0	0	S	x	x			x			$ 25,141
00746(XS)	10	0	10	7	0	0	0	0	0	0	0	0	S	x	x			x			$ 26,087
00746(XS)	8	0	10	5	0	0	0	0	0	0	0	0	S	x	x			x			$ 25,141
00746 (MD XS	8	0	10	5	0	0	0	0	0	0	0	0	M	x	x						$ 93,467
00746-3	10	100	550	7	0	0	0	0	15	0	0	0		x	x			x	x		$ 82,035
01106	8	100	250	5	0	0	0	0	20	2	0	0		x	x			x	x		$ 51,262
-	0	0	0	0	0	0	0	0	0	0	0	0									$ -

9,790 = **Total Length of Open Cut Job**

9,790 = **Total Length of Sanitary Sewer in Rock**

Total Cost for Construction = $ 1,648,835

Small Job Multiplier = 0%

Estimated Total Sewer Construction Cost = $ 1,648,835

* - Use standard pipe sizes with maximum pipe size of 144 inches

** - Minimum depth is 5 feet. For depths that are greater than 25 feet use Tunneling worksheet

Cluster Comparison

S_MI_MF_NB06_01_C_A Divert 01106, 00746 and MSD0057

CSO/SSO ID[5]		Raw Benefit Score[2,4] Regulatory Performance	Public Health	Asset Protection	Environmental Enhance	Eco-Friendly Solutions
01106		12	0	2	5	-1
00746		21	10	2	5	-1
MSD0057		12	3	2	5	-1
		0	0	0	0	0
		0	0	0	0	0
		0	0	0	0	0
				0	0	0
				0	0	0
Weighting Factor		8	10	6	8	6
Weighted Benefit Score		360	130	36	120	-18
Total Benefit Score	628					
Total Capital Cost[3]	$2,224,000					
Total Present Worth Costs[3]	$1,861,000					
Weighted Benefit/Cost Ratio (Capital Costs)	28.24					
Weighted Benefit/Cost Ratio (Total Present Worth Costs)	33.75					

Notes:

1. Data Input Cells are highlighted in yellow
2. Raw Benefit Scores for Regulatory Performance and Public Health values are from the CSO or SSO Level of Control Benefit Sheets
3. Capital and Total Present Worth Costs from the"Proj Summary" Page of the Cost Model for the clustered alternative
4. Formulas are referenced based on existing template layout, if template is changed make sure to double check referenced cells highlighted in gray
5. Use treatment plant name as ID for CSO/SSO projects that require improvements to the treatment plant

2-Year	Network Branch #6										
Value:	**Regulatory Performance - SS0s**										
	Measure	**Impact / Frequency**						**Rationale**	**Measurement Method**		
Performance Measure	**SSOs**	**6 month**	**1 Year**	**2 Year**	**5 Year**	**10 Year**	**Modeled Overflow Point or No discharge**	Regulations do not distinguish between potential impact of SSOs, therefore frequency and impact are the same for Regulatory Performance value.. Modeled Overflow Points are not considered until verified.	Measurement methods will be via hydraulic models to quantify the SSO discharge.		
Frequency	**Value**	25	16	9	4	1	0		Base	Prop	
	01106		BL		PR				16	4	12
	00746	BL			PR				25	4	21
	MSD0057-LS		BL		PR				16	4	12
Note - This value sheet calculates the total benefit.									**Subtotal**		**45**

Acronyms
AAOV - Average annual overflow volume
CSO - Combined sewer overflow
WQS - Water quality standards
WWTPs - Wastewater treatment plants
BL - Baseline
PR - Proposed

01106 - 2 YR	Network Branch #6										
Value:	Public Health Enhancement - SSOs										
	Measure	Release Impact						Rationale	Measurement Method		
Performance Measures	SSOs	Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals	Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals	Release 50,000 - 99,999 Gals	Release 20,000-49,999 Gals	Release 10,000 - 19,999 Gals	No discharge	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	6 Month	25	20	15	10	5	0		0	0	0
	1 Year	20	16	12	8	4	0	1,000 GL BL	0	0	0
	2 Year	15	12	9	6	3	0	2,000 GL BL	0	0	0
	5 Year	10	8	6	4	2	0	5,000 GL BL	0	0	0
	10 Year	5	4	3	2	1	0	8,000 GL BL	0	0	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								Average Total Score			0
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system		BL - Baseline GL - Gallons						Corrected Score			0

00746 - 2 YR	Network Branch #6										
Value:	**Public Health Enhancement - SSOs**										
	Measure	**Release Impact**						**Rationale**	**Measurement Method**		
Performance Measures	**SSOs**	**Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals**	**Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals**	**Release 50,000 - 99,999 Gals**	**Release 20,000-49,999 Gals**	**Release 10,000 - 19,999 Gals**	**No discharge**	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	**6 Month**	25	20	15	10	5	0	10,000 Gal BL	5	0	5
	1 Year	20	16	12	8	4	0	30,000 Gal BL	8	0	8
	2 Year	15	12	9	6	3	0	60,000 Gal BL	12	0	12
	5 Year	10	8	6	4	2	0	100,000 GL BL	8	4	4
	10 Year	5	4	3	2	1	0	150,000 GL BL	4	4	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								**Average Total Score**			6
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system BL - Baseline GL - Gallons								**Corrected Score**			10

MSD0057-LS - 2 YR	Network Branch #6										
Value:	Public Health Enhancement - SSOs										
	Measure	Release Impact						Rationale	Measurement Method		
Performance Measures	SSOs	Basement Flooding or Park or Blue-Line Stream > 50,000 Gals or >200,000 Gals	Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000 Gals	Release 50,000 - 99,999 Gals	Release 20,000-49,999 Gals	Release 10,000 - 19,999 Gals	No discharge	Not all discharges violate the Clean Water Act. Discharges vary in the impact to public health and the environment. Therefore, EPA developed guidance on how to set priorities based on the risk to the public's health and the environment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.		
Frequency	6 Month	25	20	15	10	5	0		0	0	0
	1 Year	20	16	12	8	4	0	6,000 GL - BL	0	0	0
	2 Year	15	12	9	6	3	0	25,000 GL - BL	6	0	6
	5 Year	10	8	6	4	2	0	60,000 GL - BL	8	6	2
	10 Year	5	4	3	2	1	0	100,000 GL - BL	4	4	0
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.								Average Total Score			2
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system		BL - Baseline GL - Gallons						Corrected Score			3

S_MI_MF_NB06_01_C_A													
Value:	Asset Protection												
	Measure			Impact						Rationale	Measurement Method		
Performance Measures		Flood Damage		Homes or businesses are subject to severe structural damage	Homes or businesses are subject to minor to moderate structural damage	Flooding limits access to homes or businesses	Flooding limits access to recreational areas	Standing water on property, but access not affected and no damage expected	No standing water	Stormwater BMPs can reduce stormwater peaks and reduce extent of flooded areas, while sewer separation may increase localized stormwater peak flows and increase the flooding impacts of storms. Alternatively, purchase of highly impacted properties may be a cheaper way to reduce flood damage and create green space and buffer zones.	Drainage models where available, historic customer complaints from MSD Customer Information System, or historic observations of flood-prone areas combined with the expected relative impacts of sewer system modifications on storm water flows.		
		Basement Back-ups		Sewer surcharging within 6 feet of ground surface for more than 20% of manholes	Sewer surcharging within 6 feet of ground surface for 10 - 20% of manholes	Sewer surcharging within 6 feet of ground surface for 5 - 10% of manholes	Sewer surcharging within 6 feet of ground surface for 1 - 5% of manholes	Sewer surcharging within 6 feet of ground surface for 0 - 1% of manholes	No surcharging within 6 feet of ground surface	First floor levels are typically 1 - 2 feet above ground surface, and basement floors are typically 8 - 10 feet below the first floor. A sewer surcharge of 6 feet below ground surface is highly likely to cause back-ups in homes with basement service.	Measurement methods will be via hydraulic models to quantify the hydraulic grade lines compared to ground surface elevations at manholes.		
	Storm Events			Most Severe Impact				Least Impact	No Impact				
				5	4	3	2	1	0	Assumptions	Base Case Score	Alternative Score	Total Score
Frequency	6 Month	Most Likely	5	25	20	15	10	5	0		10	5	5
	1 Year		4	20	16	12	8	4	0		8	8	0
	2 Year		3	15	12	9	6	3	0		6	6	0
	5 Year		2	10	8	6	4	2	0		4	4	0
	10 Year	Least Likely	1	5	4	3	2	1	0		3	2	1
	Not Possible	Not Possible	0	0	0	0	0	0	0	Average			1
Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.										Total Score			2
Acronyms BMPs - Best management practices													

S_MI_MF_NB06_01_C_A														
Value:	**Environmental Enhancement**													
	Scoring													
Aspect	-5	-4	-3	-2	-1	0	1	2	3	4	5	Assumptions	Score Per Aspect
Aquatic and Terrestrial Habitat Protection	Diminution of habitat for rare or endangered species	Diminution of significant amount of common habitat	Diminution of some amount of common habitat	Significant habitat improvement	Minor improvement to existing habitat	No impact on habitat	Minor enhancement of existing habitat	Significant amount enhancement of terrestrial habitat	Creation of some amount of common habitat	1 hectare or significant amount of common habitat	Creation of critical habitat for rare or endangered species		0
Aesthetics - Solids and Floatables	>15% reduction in volume of flow with no SMP measure	5% - 15% of flow with no SMP measure	2% - 5% of flow with no SMP measure	1% - 2% of flow with no SMP removal	Reduces emergency or existing SMP control device 1 - 10% of flow with no SMP removal	No change in SMP removal	5 - 10% of discharged flow treated with passive SMP removal (screens)	15 - 25 % of discharged flow treated with passive SMP removal (screens)	25 - 50% of discharged flow treated with passive SMP removal (screens)	50 - 75% of discharged flow treated with passive SMP removal (screens)	75% + of discharged flow treated with passive SMP removal (screens)		0
Aesthetics - Odor and Air Emissions	Creates annoying odor source affecting > 20 customers often	Creates annoying odor source affecting <20 customers often, or > 20 customers occasionally	Creats annoying odor source affecting <20 customers occasionally	Create detectable odor source affecting >10 customers occasionally	Create detectable odor source affecting < 10 customers occasionally	No impact on odors	Eliminate detectable odor source affecting > 50 customers occasionally	Eliminate detectable odor source affecting < 50 customers often	Eliminate annoying odor source affecting > 20 customers often	Eliminate annoying odor source affecting < 20 customers occasionally	Eliminate annoying odor source wide ling >20 customers often		0
Dissolved Oxygen Impacts	Reduction in minimum DO by 2 mg/l - Solve critical flow periods	Continuous reduction of in-stream DO of 2 mg/l	Continuous reduction of in-stream DO of 0 - 2 mg/l; possible reduction of in-stream DO 0 - 4 mg/l during critical conditions	Intermittent reduction of in-stream DO 0 - 2 mg/l; possible reduction of in-stream DO 0 - 4 mg/l during critical conditions	Intermittent reduction of in-stream DO 0 - 2 mg/l; possible during non-critical conditions	No DO impacts	Intermittent improvement in in-stream DO 0 - 2 mg/l	Intermittent improvement of in-stream DO 0 - 2 mg/l; intermittent critical conditions improvements (2 - 4 mg/l	Continuous improvement of in-stream DO 0 - 2 mg/l; intermittent critical condition improvements (2-4 mg/l	Continuous improvement of in-stream DO 0 mg/l +	Continuous improvement of critical condition in-stream DO 2 mg/l +		0
Downstream Impacts	75%+ increase in annual BOD or nutrient loads	50 - 75% increase in annual BOD or nutrient loads	25 - 50% increase in annual BOD or bulked loads	10 - 25% increase in annual BOD or nutrient loads (CSO + runoff)	Potential 5 - 10 % increase in annual average BOD or bulked loads (CSO + runoff)	No impact on BOD or nutrient loads (CSO + runoff)	5 - 10% reduction in annual BOD or nutrient loads (CSO + runoff)	10 - 25% reduction in annual BOD or nutrient loads (CSO + runoff)	25 - 50% reduction in annual BOD or nutrient loads (CSO + runoff)	50 - 75% reduction in annual BOD or nutrient loads (CSO + runoff)	75%+ reduction in annual BOD or nutrient loads (CSO + runoff)		0
Stream Flow Impacts (Peak flows)	25% + increase in peak flows	15% - 25% increase in peak flows	Up to 10% increase in peak flows	Frequent increase in flow during critical conditions	Possible increase in average flow or more erosive in high flow peaks	No impact on peak flows	Minor reduction in peak flow; no significant peak reduction	Minor reduction in peak flows under some conditions	Up to 10% reduction in peak flows	10% - 25% reduction in peak flows	25%+ reduction in peak flows		0
Stream Flow Impacts (DWF only)	25%+ increase in low during critical conditions	10% - 25% decrease in flow during critical conditions	5%-10% permanent decrease in flow during critical conditions	Frequent decrease in flow during critical conditions	Possible decrease in average flow	No impact on low flow or base stream flow	Intermittent increase in stream flow - not limited to critical conditions	Unmodified increase in stream flow - page, enjoyment, in all conditions	5 - 10% permanent increase in stream flow during critical conditions	10 - 25 % permanent increase in stream flow during critical conditions	25%+ permanent increase in stream flow during critical conditions		0
Instructions: (1.) Score each alternative for each of the seven aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "fatal flaw". Alternatives that score in this area should not be proposed.										Total Raw Score Calculated			0
										Corrected Score			0

Aspect	Rationale	Measurement Method
Aquatic and Terrestrial Habitat Protection	Wet weather projects may affect both aquatic and terrestrial habitat through changes in base flow, peak flow, water quality, bird cover, channel shape and characteristics etc. Predictive models used to evaluate wet weather control measures have a limited ability to predict biological diversity changes erosion impacts etc., so surrogate metrics must be used to estimate future positive and negative impacts.	Project definition may specifically address changes in channel shape and configuration, tree cover etc. Predictive models will address DO, and other water quality impacts. Flow models will predict base flow and peak flow rates to allow estimates of changes in erosion and water surface area
Aesthetics - Solids and Floatables	Most CSOs have some form of solids and floatables control baffles. Improvements in capture rates can be expected with screening or other advanced treatment options. Storm water retention, constructed wetlands, and other control systems may provide solids and floatables removal as well. While reduction in solids and floatables removal efficiency is not likely, penalty points will be assessed if this is possible with any alternative.	Current solids and floatables removal efficiency has been estimated for all sites with control technology. Improvements in removal efficiencies will be estimated for all alternatives that add screening or other advanced treatment technologies. Where treatment is proposed for storm water discharges removals will be estimated based on published removal data.
Aesthetics - Odor and Air Emissions	Odors and air emissions can be generated in storage systems, pump stations, force mains, and long flat sewers. Odors are generally characterized by both the intensity and the quality of the odor. Detectable and annoying are two common descriptors of different intensities and qualities of odors from sewage handling facilities.	Odor emissions from sewage handling facilities can be modeled for intensity, quality, and geographic spread. The planning purposes the level of evaluation is not customer, and will not be done except in very rare circumstances. The potential for odor and air emissions will be estimated based on typical applications and model predictions for storage time, number of events, average flow velocities etc.
Dissolved Oxygen Impacts	Dissolved oxygen in streams is dependent on a variety of factors including BOD load, nutrient load, stream flow velocity, water temperature, etc.	For BOD the Water Quality Tool will be used to estimate the impacts of various loading conditions, flows, temperatures, etc. Probable impacts of individual projects will be estimated based on comparisons to the various stream condition scenarios
Downstream Impacts	Downstream impacts refer to conditions in the Ohio River below Jefferson County. Nutrient loadings in the Ohio (not just Jefferson County) have been identified as the source of 30 - 45% of the total nutrient loads reaching the Gulf of Mexico. BOD is not likely to persist in the river long enough to get to the Gulf, but can have detrimental impacts far downriver	Pollutant removals will be estimated based on reductions in annual average loads, since the downstream impacts are primarily long-term and cumulative.
Stream Flow Impacts (Peak flows)	Extraordinarily high peak flows as are often caused by urbanization of a watershed can erode the streambed, damage aquatic and terrestrial habitat, make water based recreation unsafe or impractical	Predictive models can estimate flow peaking factors from individual sources, and the Water Quality Tool has a hydraulic component to estimate stream flows during various storm events
Stream Flow Impacts (DWF only)	Diversion of flows away from a stream due to abandonment of a treatment plant etc. can reduce base flows in a stream. Alternatively, other control measures such as groundwater pumping can increase base flows with beneficial results.	Predictive models can estimate flows from individual sources, and the Water Quality Tool has a hydraulic component to estimate stream flows during various dry weather events.

Note: The total score calculated may be more than 25 in the instances where this might occur, a default maximum score of 25 will be calculated.

Acronyms
BGC - Beargrass Creek
BOD - biological oxygen demand
CSO - Combined sewer overflow
DO - Dissolved oxygen
DWF - Dry weather flow
mg/l - Milligram per liter
SMP - Solids and floatables

S_MI_MF_NB06_01_C_A													
Value:	**Eco-Friendly Solutions**												
	Scoring												
Aspect	-5	-4	-3	-2	-1	0	1	2	3	4	5	Assumptions	Score Per Aspect
Non-Renewable Energy Consumption	Primary energy consumption is greater than secondary treatment	Primary energy consumption equal to 75 - 100% of secondary treatment	Primary energy consumption equal to 50 - 75% of secondary treatment	Primary energy consumption equal to 25 - 50% of secondary treatment	Primary energy consumption equal to 15 - 25% of secondary treatment	Net energy consumption except for cleaning and maintenance	Cleaning and maintenance (not needed) will primary consumption	NA	NA	NA	NA		0
Use of Natural Systems	Constructed facilities permanently displace 5+ acres wetlands or 50% locally available green space	Constructed facilities permanently displace 3 - 5 acres wetlands or 25 - 50% locally available green space	Constructed facilities permanently displace 1 - 3 acres wetlands or 10 - 15% locally available green space	Constructed facilities permanently displace 0 - 1 acre wetlands or up to 10% locally available green space	Constructed facilities temporarily disrupt wetlands or green space	Alternative does not use or affect natural systems, wetlands, or green space	Alternative does not use natural systems, but enhances green space or wetland	Natural systems play a minor role in alternative function, up to 1 acre wetland or 10% additional green space created	Natural systems are significant part of alternative function, 1 - 3 acres of wetland created or 25-50% additional green space	Alternative fully uses natural systems, 3 - 5 acres of wetland created or 25-50% additional green space	Alternative results in multi-use natural system development, 5+ acres of wetland or 50% additional green space		0
Multiple-Use Facilities	Constructed facilities permanently eliminate recreational opportunity	Constructed facilities significantly impair recreational opportunity	Constructed facilities moderately impair recreational opportunity	Constructed facilities have minor impacts on recreational opportunity	Construction temporarily impacts recreational opportunity	No impacts on recreational opportunities	Alternative improves access to existing recreational areas	Alternative has limited positive impact on recreation	Alternative significantly enhances recreational opportunities	Alternative increases recreational opportunities in area	Alternative results in multi-use facility		0
Source Control of subwatershed pollutant loads	Pollutant loadings are increased by 50%	Pollutant loadings are increased by 30 - 50%	Pollutant loadings are increased by 10 - 30%	End of pipe pollutant loadings are increased by 0 - 10%	End of pipe pollutant loadings impacts are inconsistent, but likely higher	End of pipe pollutant loadings are unchanged	Pollutant loadings impacts are inconsistent, but likely lower	Source control reduces pollutant loadings by 0 - 10%	Source control reduces pollutant loadings by 10 - 30%	Source control reduces pollutant loadings by 30 - 50%	Source control reduces pollutant loadings by more than 50%		0
Non-Obtrusive Construction Techniques	Permanent loss of green space or sensitive area disruption	Main thoroughfare Closures, sensitive area temporary disruptions	Widespread dust and noise, hauling, secondary street closures	Localized dust, noise and local street closures	Minor dust and noise, traffic lane closures	No construction impacts	NA	NA	NA	NA	NA	Some construction disruptions can be minimal (pavement restoration)	0
Consistent Land Use	Intrusive or nuisance facilities inconsistent with neighborhood or land use	Facilities inconsistent with neighborhood or land use	Facility characteristics mitigated to reduce impact on neighborhood	Facilities have significant impact on development density or land use	Facility has minor impact on development density or land use	No impact on land use or no above ground facilities	Alternative mitigates existing compatibility problem	Alternative removes facility inconsistent with neighborhood	Alternative removes nuisance facility from neighborhood	Alternative enhances property values in neighborhood	Alternative provides enhancements that significantly improve neighborhood		0
Impermeable Surfaces	5 acres+ of impermeable surfaces are added	3 - 5 acres of impermeable surfaces are added	1 - 3 acres of impermeable surfaces are added	up to 1 acre of impermeable surfaces are added	Minor increase in impermeable surfaces added	No change in impermeable surface	Minor reduction in impermeable surfaces	Up to 1 acre of impermeable surfaces removed	1 - 3 acres of impermeable surfaces removed	3 - 5 acres of impermeable surfaces removed	More than 5 acres of impermeable surfaces removed		0
LEEDS Performance	NA	NA	NA	NA	NA	LEEDS not applicable or LEEDS score < 10	LEEDS Score 10 - 25	LEEDS Certified	LEEDS Silver	LEEDS Gold	LEEDS Platinum		0

Instructions: (1.) Score each alternative for each of the eight aspects of the value. Scores can be positive or negative, depending on the impact of the alternative on the value. (2.) Total the scores for each aspect to get the total score for this alternative in this value. (3.) Shaded area represents "fatal flaw". Alternatives that score in this area should not be proposed.

Total Raw Score Calculated	0
Corrected Score	0

Note: The total score calculated may be more than 25. In the instances where this might occur, a default maximum score of 25 will be calculated.

Aspect	Rationale	Measurement Method
Non-Renewable Energy Consumption	Eco-friendly solutions would be expected to be low consumers of non-renewable energy. Benchmarking energy consumption against conventional secondary treatment provides penalty points for high energy consuming alternatives.	Evaluation of primary energy consumed per MG of flow treated, compared to the energy consumed in the WCWTP per MG treated
Use of Natural Systems	Natural systems replace concrete and steel construction with wet bottom storage lagoons, constructed bioswales, rain gardens etc. that increase green space of various kinds. Options that reduce wetlands and green space get penalty points.	Acres of wetlands and other types of green space created or eliminated. Also includes subjective evaluation of the "basis" of the alternative: "green" or "grey"
Multiple-Use Facilities	Eco-friendly solutions create recreational opportunities for both water based and riparian recreation. Boating, canoeing, kayaking, fishing, wading, swimming etc. would be direct water based recreation. Bird watching, hiking, biking, picnicing, camping etc. would be considered related riparian recreation.	Subjective evaluation of changes predicted in the aquatic or riparian environment as a result of better water quality, increased base flow or diminished flow peaks, increased tree cover or vegetated riparian areas etc.
Source Control of subwatershed pollutant loads	Controlling pollutant loads at the source through behavior modification, product replacements or stormwater management BMPs that capture pollutants thereby reducing end of pipe treatment requirements	Modeled land-side pollutant loading reductions as calculated by the BGC Water Quality Tool or by comparison to literature values or pilot program measurements.
Non-Obtrusive Construction Techniques	Probable construction impacts on traffic, noise and dust are all measures of the friendliness of an alternative. Construction impacts get penalty points for creating nuisance conditions.	Subjective evaluation of probable construction impacts based on the type of construction envisioned for the alternative.
Consistent Land Use	Alternative configuration can either enhance or detract from the surrounding property. For example, an extremely unfriendly pump station can be noisy, smelly, and ugly. The same pump station can be "disguised" as a residence that fits right in with the neighborhood. If a larger parcel of land is available, a pump station can be hidden from view by landscaping, and a community garden or other green space added to enhance the neighborhood.	At the planning level, projects can be defined to avoid negative impacts on the surrounding properties. Depending on the availability of land, enhancements are possible. This aspect encourages project definition and budgets to enhance, not detract.
Impermeable Surfaces	Adding impermeable surfaces increases total runoff volume, peak runoff flowrates, and the total transport of any pollutant deposited on the surface from any source. Conversely, permeable surfaces can reduce flow volume and peaks, and provide filtering mechanisms for pollutants.	Acres of permeable surfaces created or eliminated
LEEDS Performance	LEED standards are applicable to alternatives that include above-ground building structures.	Application of LEED evaluation points

Acronyms
BGC - Beargrass Creek
LEEDS - Leadership in Energy and Environmental Design
MG - million gallons
WCWTP - West County Wastewater Treatment Plant

Project WIN
Public Information and Outreach (PIO) Program

June 19, 2008

Presentation Objectives

- Describe the regulatory expectations for an overflow abatement PIO program
- Summarize Project WIN's PIO successes to date
- Explain the on-going role of PIO during implementation of the IOAP
- Describe specific PIO approaches envisioned for 2009 - 2024

Regulatory Guidance

Sets Minimum Expectations for PIO in Overflow Abatement Programs

- NMC and SORP require notification of potential health hazards
- LTCP guidance requires obtaining public input on overflow abatement approaches, strategies, and level of control
- Consent Decree establishes Wet Weather Team and its required areas of input
  - PIO for general public
  - Financing and funding plan

PROJECT WIN
Waterway Improvements Now

CLEAN, GREEN, GROWING COMMUNITY

Project WIN's Current PIO Program

Exceeds Regulatory Expectations

- Public notification through signs, web page alerts, automated email etc.
- 18 Project WIN public meetings
- 200+ presentations to community groups, and many other outreach events
- Newspaper articles, ads, TV and radio interviews, direct mail, door hangers, etc.
- Expanded scope and participation of WWT Stakeholder Group

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Waterway Improvements Now

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Role of Ongoing PIO Program
Provide Sustainability

- Promote voluntary participation in private-side I&I control, green infrastructure
- Continue support for financial investment required
- Instill a sense of personal ownership and responsibility for clean water
- Educating children ensures long-term sustainability of voluntary participation

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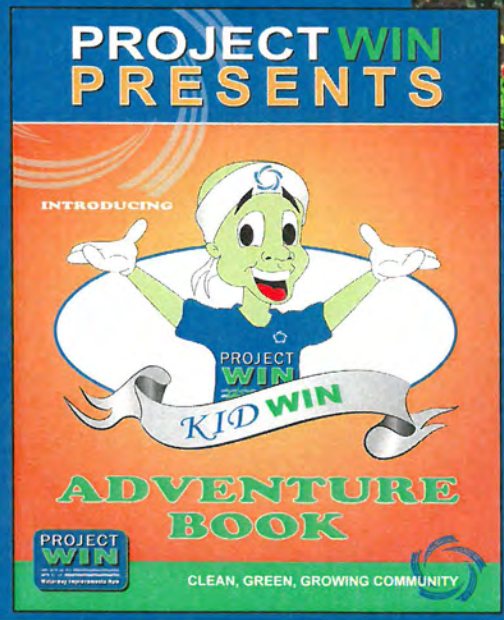
MSD



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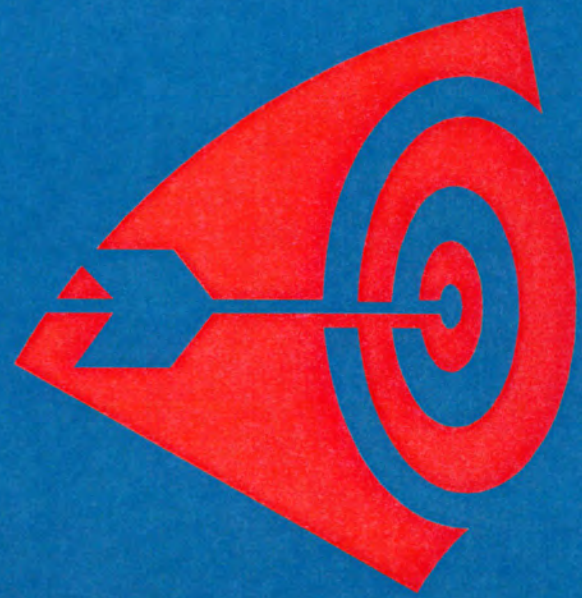
PIO Program Addresses Several Audiences

- General Public
- Target Groups
  - Property Owners
  - Project Neighborhoods
  - Builders
  - Restaurants
- Schools/Children



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General Public PIO

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

PROJECT WIN
Waterway Improvements Now

Targeted Groups
Tailored for Situation

- Property Owners
  - •Private property I&I control, green infrastructure participation, etc.
- Project Neighborhoods
  - •Focused project participation
  - •Design input
  - •"Pardon our dust"
  - •Project wrap-up and reporting
- Builders
  - • Low Impact Development
- Restaurants
  - •Grease control

PROJECT WIN
Waterway Improvements Now

Expanded School Partnerships
Immediate and Long-Term Goals

- Environmental Education
  - Healthy streams
  - Pollution sources and impacts
  - Personal Responsibility
  - Activities that make a difference
  - Life-long behavior changes
  - Carry back to family life

MSD's support provides hands-on learning opportunities

PROJECT WIN
Waterway Improvements Now

CLEAN, GREEN, GROWING COMMUNITY

Comprehensive PIO Program
Uses Wide Range of Media

AUDIENCE	Public Meetings and Community Events	Web Portal to Project WIN Information	Speaker's Bureau and Technical Support	Print Advertisement, Press Releases	Public TV Video, TV and Radio PSA	Recognition Programs	Targeted brochures, pamphlets, etc.	Reports, Newsletters and Billing Inserts	Demonstration Projects	Direct Mail and Phone Surveys	Signage at Overflows	Tours, Demonstreations, Workshops
General Public	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Homeowners	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔
Targeted Neighborhoods	✔	✔	✔	✔		✔	✔		✔	✔		✔
Builders		✔	✔			✔	✔		✔	✔		✔
Restaurants		✔	✔				✔		✔	✔		✔

PROJECT WIN
Waterway Improvements Now

We will talk about several of these in more detail

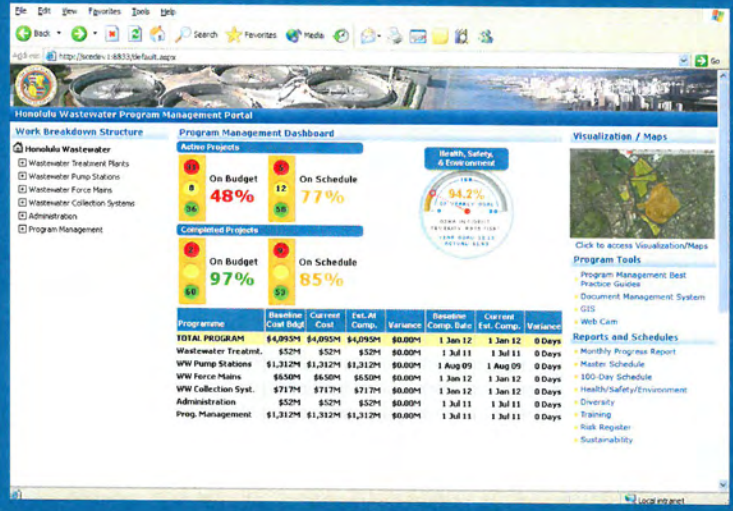
Public Meetings and Events
Cornerstone of MSD's PIO

- Annual Project WIN update meetings
  - Progress reports
  - Next year's activities
- Mayor's Night Out
- State Fair
- Community festivals and events
- Earth Day, Public Health Week
- Clean Sweeps
- Project meetings
  - Planning stage
  - Construction stage
  - Close-out reporting

PROJECT WIN
Waterway Improvements Now

Enhanced Web Portal
Provides Detailed Information

- Project Fact Sheets
- Project status & photos
- Technical support
- Recognition program
- Maps and graphics
- Water quality trends



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Waterway Improvements Now

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File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://scodev1:8833/default.aspx Go

Honolulu Wastewater Program Management Portal

Work Breakdown Structure

- Honolulu Wastewater
  - Wastewater Treatment Plants
  - Wastewater Pump Stations
  - Wastewater Force Mains
  - Wastewater Collection Systems
  - Administration
  - Program Management

Program Management Dashboard

Active Projects

31 / 8 / 36 — On Budget **48%**

5 / 12 / 58 — On Schedule **77%**

Completed Projects

2 / 60 — On Budget **97%**

9 / 53 — On Schedule **85%**

Health, Safety, & Environment

Programme	Baseline Cost Bdgt	Current Cost	Est. At Comp.	Variance	Baseline Comp. Date	Current Est. Comp.	Variance
TOTAL PROGRAM	$4,095M	$4,095M	$4,095M	$0.00M	1 Jan 12	1 Jan 12	0 Days
Wastewater Treatmt.	$52M	$52M	$52M	$0.00M	1 Jul 11	1 Jul 11	0 Days
WW Pump Stations	$1,312M	$1,312M	$1,312M	$0.00M	1 Aug 09	1 Aug 09	0 Days
WW Force Mains	$650M	$650M	$650M	$0.00M	1 Jan 12	1 Jan 12	0 Days
WW Collection Syst.	$717M	$717M	$717M	$0.00M	1 Jan 12	1 Jan 12	0 Days
Administration	$52M	$52M	$52M	$0.00M	1 Jul 11	1 Jul 11	0 Days
Prog. Management	$1,312M	$1,312M	$1,312M	$0.00M	1 Jul 11	1 Jul 11	0 Days

Visualization / Maps

Click to access Visualization/Maps

Program Tools

- Program Management Best Practice Guides
- Document Management System
- GIS
- Web Cam

Reports and Schedules

- Monthly Progress Report
- Master Schedule
- 100-Day Schedule
- Health/Safety/Environment
- Diversity
- Training
- Risk Register
- Sustainability

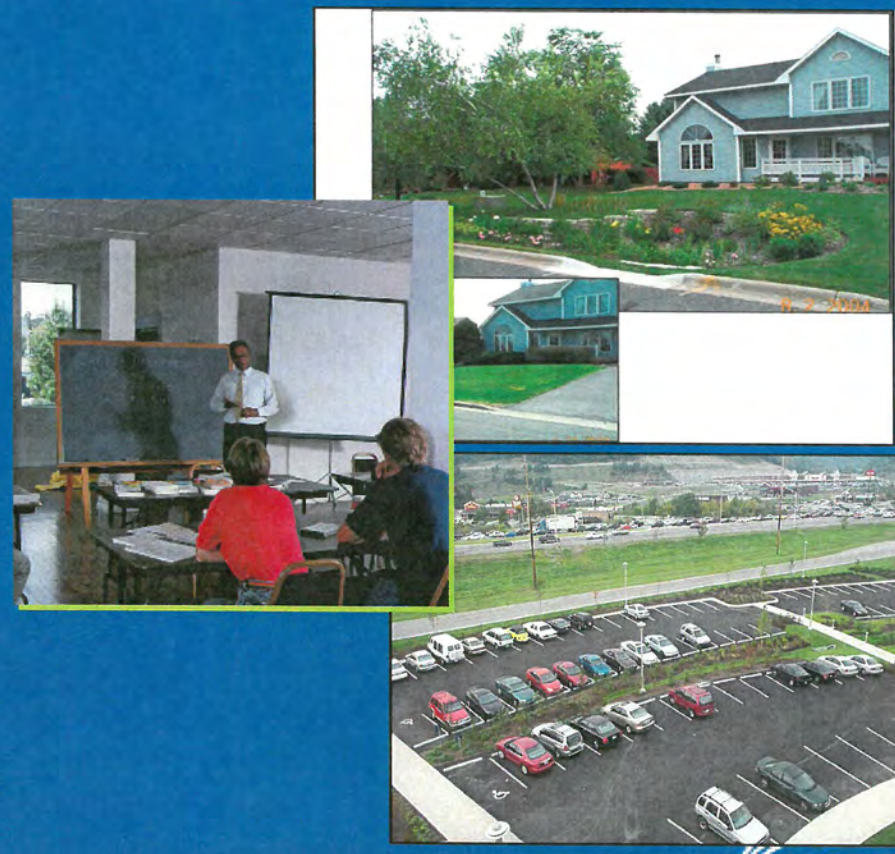
Local intranet

PROJECT WIN — Waterway Improvements Now

CLEAN, GREEN, GROWING COMMUNITY

Speaker's Bureau
Adds Technical Support Function

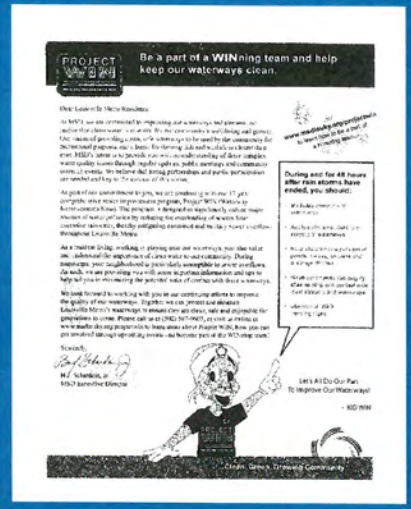
- MSD Vision, Mission, Goals, plans and progress
- Project WIN progress and future activities
- Green Infrastructure
- Rain barrels and rain gardens
- Green roofs
- Pervious pavement, parking lots, drainage



PROJECT WIN
Waterway Improvements Now

Print and Electronic Media
Reach Large Audiences

- Print advertisements for special events and short seasonal messages
- Press releases and media relations provide context and detail for issues
- TV and radio ads for high-impact notification
- Metro TV provides opportunities for spot messages and expanded public meeting coverage



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Waterway Improvements Now

Recognition Programs
Reward Desired Behavior

- Lawn signs for rain gardens and rain barrels
- Board certificates, press releases with photos for significant business contributions
- Individuals recognized in MSD newsletters and other MSD publications
- Schools, school programs, individual student recognition

PROJECT WIN
Waterway Improvements Now

Demonstration Projects
Prove Investment Value

- Rain gardens and rain barrels
- Green streets
- Green Roofs
- Pervious pavement and green parking lots
- Stream restoration following overflow abatement project
- Residential, government, commercial property
- MSD to lead by example

PROJECT WIN
Waterway Improvements Now

Tours, Demonstrations, Workshops
Appropriate for All Target Audiences

- Wastewater treatment understanding
- Green infrastructure
  - Homeowners
  - Commercial buildings
  - Parking lots and drainage
- Private Property I&I Reduction
- Riparian protection
- Most effective with schools

PROJECT WIN
Waterway Improvements Now

Enhanced School Partnership

- Continue current programs
- Expand high-school partnership program
  - Each regional plant paired with JCPS high school
  - Plant site provides "environmental laboratory"
  - May tie to stream monitoring and restoration programs
- Expand middle-school activities
- Develop awards program for exemplary school programs and recognize publicly

PROJECT WIN
Waterway Improvements Now

PIO Effectiveness
Annual Monitoring to Prove Value

- Customer surveys
  - bill stuffer
  - phone
- Web page feedback blog
- Customer Relations follow-up
- Metrics established and trended

PROJECT WIN
Waterway Improvements Now

Discussion Summary and Path Forward

PROJECT WIN
Waterway Improvements Now

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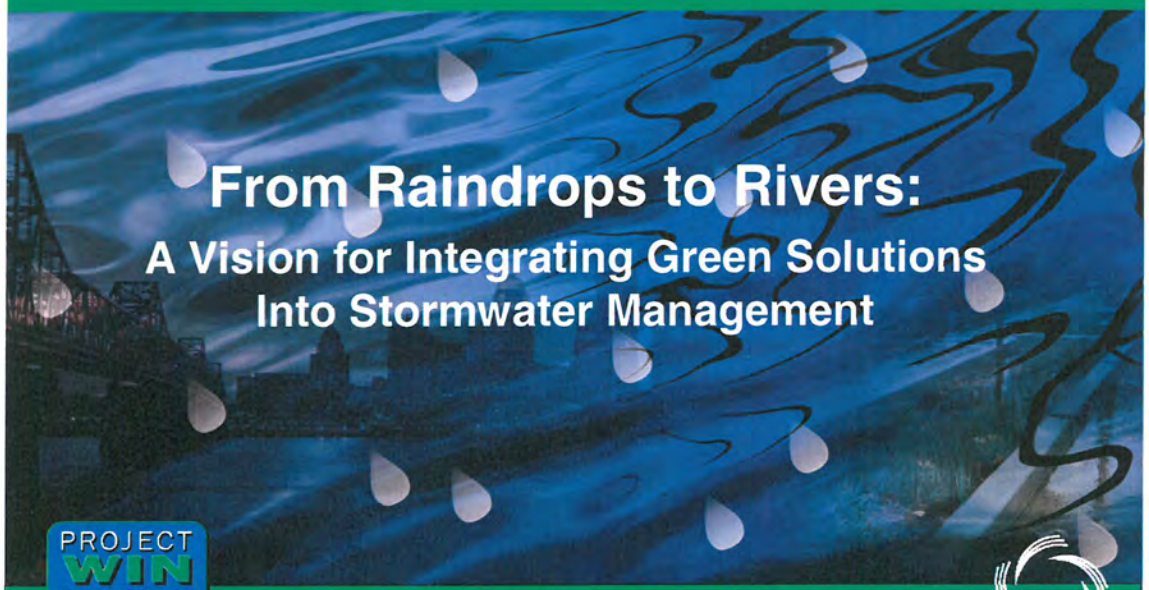
Louisville: The Green City



From Raindrops to Rivers:
A Vision for Integrating Green Solutions Into Stormwater Management

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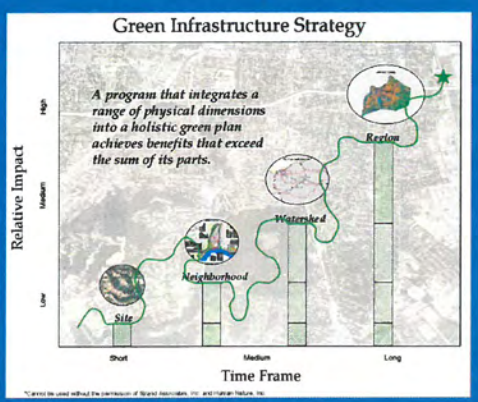
Green Infrastructure Analysis

Analysis at Multiple Scales:

- Metro/County
- CSO Area
- Focus Areas
- Sewersheds
- Projects



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Regional Vision

Human Nature Inc. - Strand Associates Inc.

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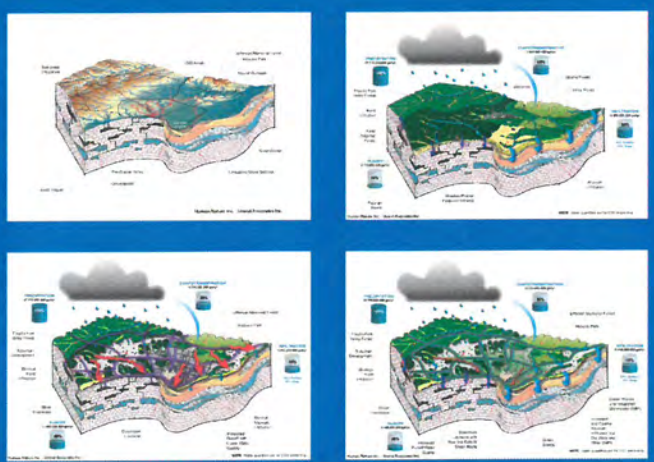
Green Infrastructure Vision Summary - Back to the Future

WATER BALANCE
&
THE ANATOMY OF A GREEN CITY



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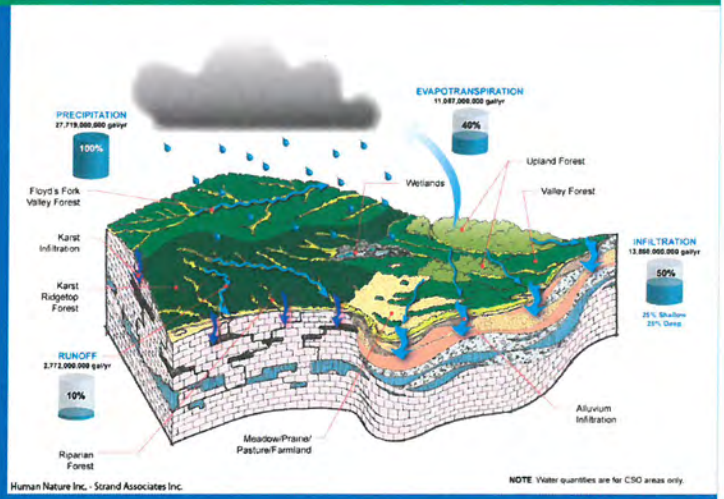
Green Infrastructure Vision Summary

PRE-SETTLEMENT VEGETATIVE COVER & WATER BALANCE



PROJECT WIN Waterway Improvements Now

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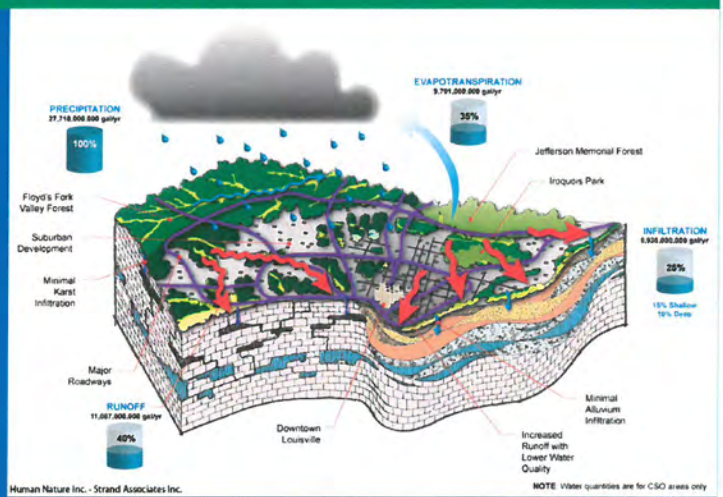
Green Infrastructure Vision Summary

CURRENT LAND COVER & WATER BALANCE



PROJECT WIN Waterway Improvements Now

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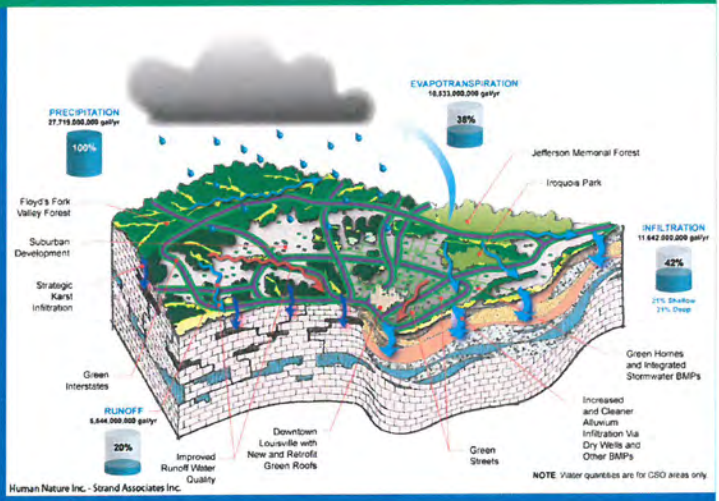
Green Infrastructure Vision Summary

FUTURE LAND COVER & WATER BALANCE



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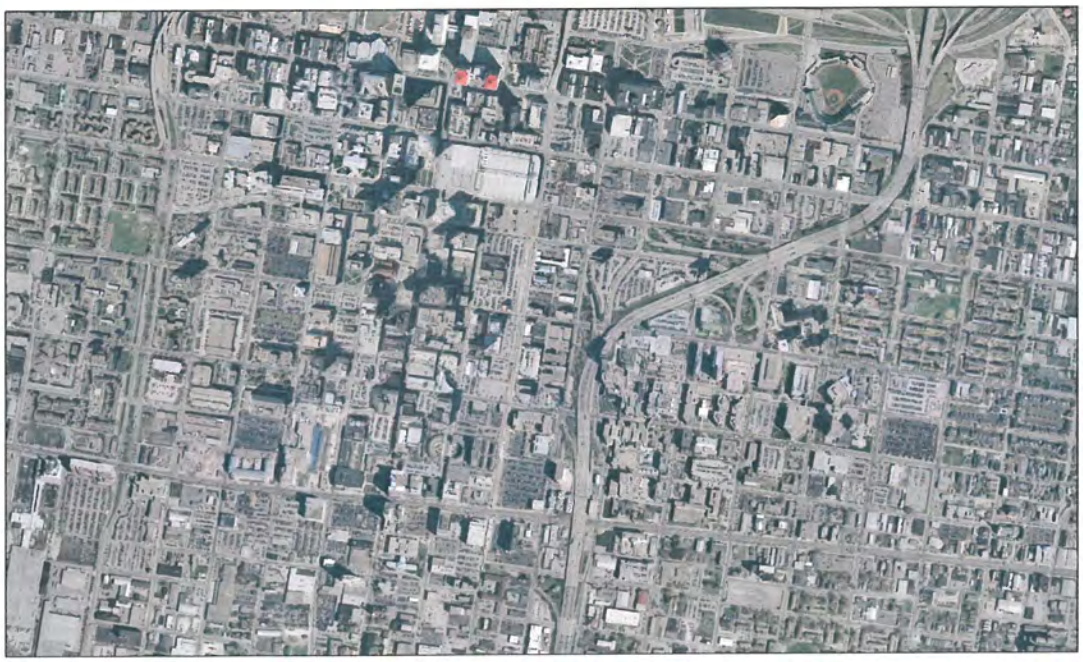
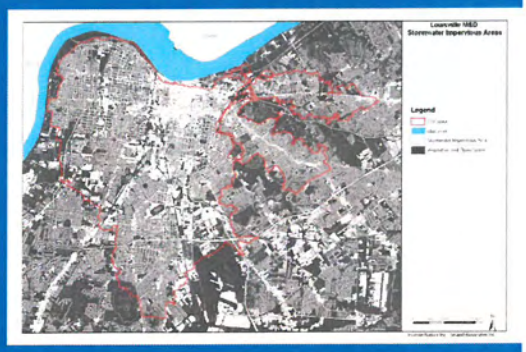
Impervious Area



Impervious Area Evaluation

- CSS Area – 49% Impervious
  - Roads – 27%
  - Single Family – 27%
  - Industrial Property – 16%
  - Commercial Property – 13%



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Green Infrastructure Strategies

PROGRAM COMPONENTS

- **Downspout Disconnection Program**
- **Vegetated Roof Program**
- **Rain Barrel Program**
- **Dry Wells**
- **Urban Reforestation**

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Downspout Disconnect

- 88,000 Residential Homes
- 93 million SF of rooftop
- 2 billion gallons annually of storm water runoff

Considering : $6 Million program to disconnect 24,000 downspout yields > 100 MG annually

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Downspout Disconnect

- Average Roof Size = 1,052 sf
- 2 disconnections/home
- $250/disconnection
- Est. Cost per Gallon Removed = $0.21

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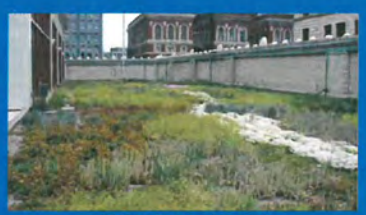
Vegetated Roof

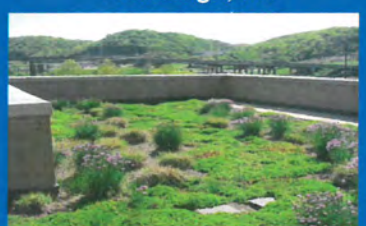
7.4 Million S.F. of public building rooftops (170 acres)

Runoff generated = 160 MG/year

Considering: Incentive program



Pittsburgh, PA



Fort Wright, KY

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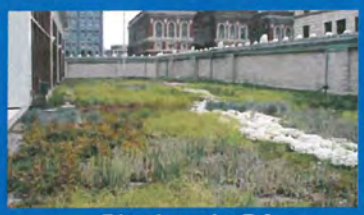
Vegetated Roof

- Assume $20/sf (conservative)
- Developing Value to MSD ($2/sf, $4/sf, etc.)



Pittsburgh, PA

Fort Wright, KY

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Rain Barrel Program

- 88,000 residential properties
- 2 rain barrels/home = 500 MGY
- 10% participation = 50 million gallons/year

Suggested Program: 1,000 barrels/year @ $125,000/year

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Dry Wells

- 19,000 catch basins in West Side
- 1.8 BGY of runoff
- $20,000/well
- < $0.25/gallon (annually)

Suggested Program: Identify locations for construction of demonstration projects

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Urban Reforestation

Existing CSS: 11% Tree Canopy

Suggested Program: Increase tree canopy by 15% to provide 53 MG in stormwater reduction

- Carbon Stored 196,364 tons
- Carbon Sequestered 1,528 tons per year
- Air pollution removal 463,724 lbs per year

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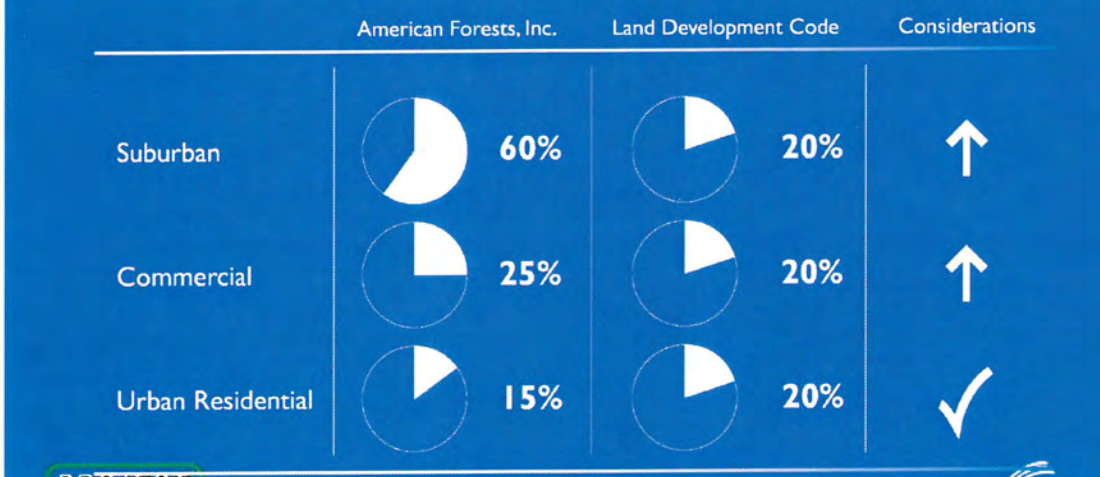
Tree Canopy



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Green Projects

Green Alleys

- CSO 015
- CSO 53
- CSO 121

Cost $11-$14/ square foot

Drainage areas are site specific

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Green Projects

Green Parking Lots (Biofiltration)

- CSO 53
- CSO 181
- CSO 160

Cost $10-$20/square foot

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Green Projects

Green Streets

- CSO 121
- CSO 191
- CSO 208

Cost $5-$15/square foot

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Discussion

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