# Wet Weather Team Project

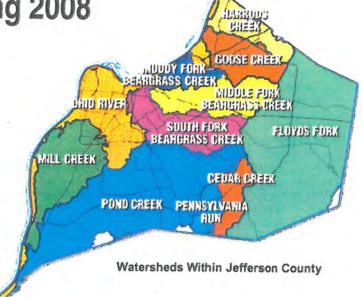
**Meeting Materials** 

01.05.0219.08 WWT Stakeholders Meeting # 19 6/19/2008

Summer 2007-Spring 2008















## 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)

## 6/19/08 Wet Weather Team Meeting Agenda, Continued

## 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.
- <u>Draft TMDL for Beargrass Creek:</u> 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.
  - o "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

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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

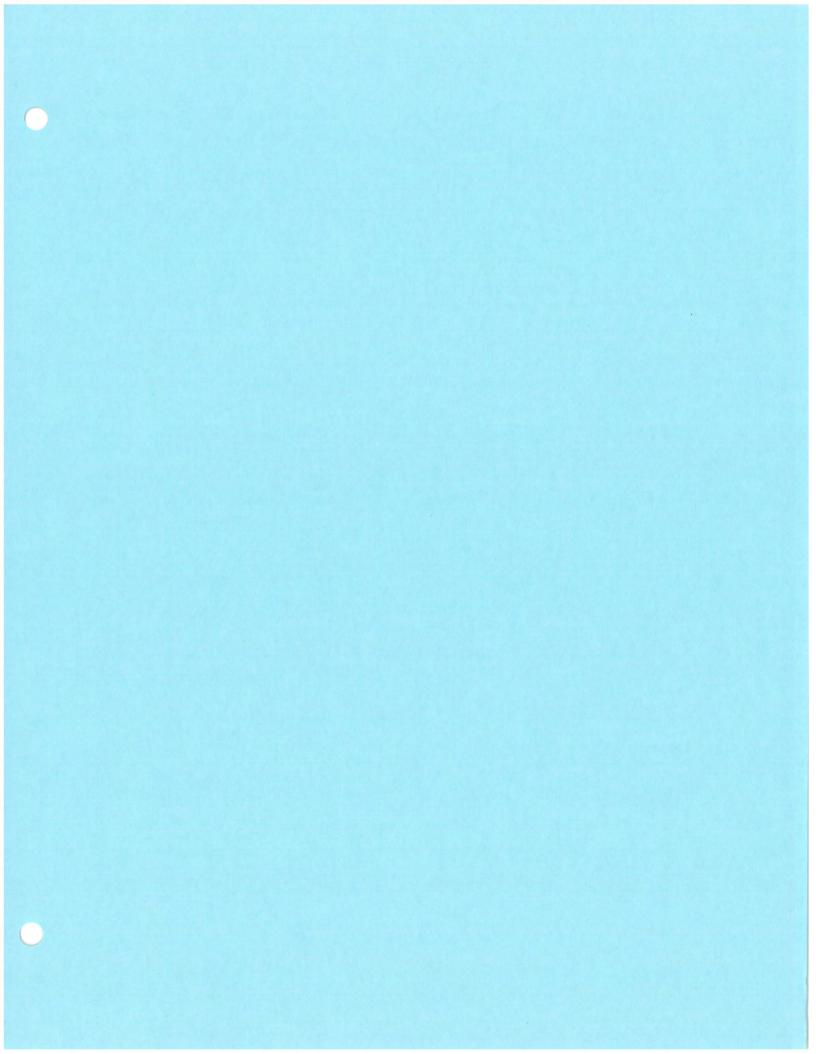
Gary Wolnitzek, Human Nature

#### **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
  - o Map
  - Cluster Comparison Table
  - o 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"

## 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 Plan
3	Tuesday, September 12, 2006	MSD Central Maintenance Facility
4	Tuesday, December 5, 2006	MSD Central Maintenance Facility
2007 Wet 1	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 V	Veather 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)

- (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.
- (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.)
- (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.
- (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)

 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.
- Discourage chemical treatment of and mowing near waterways to help keep debris from waterways.
- 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).
- 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.
  - 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 <a href="http://www.watershedpledge.org">http://www.watershedpledge.org</a> (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 plagues 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
- 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
  - 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.
  - Use the Butchertown Greenway Pump Station that is offline for an education and demonstration facility.
- 9. Plant native plants with deep root systems.
- 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.
- Repair and seal all building laterals.
- 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

- Leverage and coordinate the Wet Weather Program efforts with MSD's MS4 stormwater management permitting responsibilities.
- 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.
- Create a localized resource database to support green infrastructure development efforts (e.g., provide information on contractors that install pervious pavements). Specific ideas include:
  - 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.
- Install new sanitary lines and laterals to homes, and pumps for basement facilities when requested by the homeowner.
- 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.
- 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.

 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.
- 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.
- 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.
- 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.
- 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.
- 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

- 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:
  - 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.
    - 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.
- Charge residences differently depending on the area of impervious surfaces on properties (and therefore the amount of stormwater runoff that would be generated).
- 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.
  - Examine the verification and process and criteria that LG&E uses for its Winterhelp program.
- 7. General principles for funding and cost allocation:

- 1. 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.
- 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.
- 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.
- 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.
  - 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.
- 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.
    - 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).
- 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.
- 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.
- 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.
- 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

- 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.
- 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.
- 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.
- 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.
  - Allow property owners to make repairs themselves and then have certified inspectors inspect the repairs.
  - 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.
  - 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.
- i. 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.
  - 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.
  - 1. A draft ordinance should be reviewed by a county/city attorney.

## Opportunities to Encourage/Use Green Infrastructure in Development Projects

 Utilize very large basins or lakes in new development areas and in rural areas. For new developments, create larger detention/retention basins.

- 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.
- Look at opportunities to develop more upward and infill already developed areas (i.e., increase density).
- 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:
  - 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.
- 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.'
- 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.
- 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

- 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.
- Work with governmental entities to "lead by example" by eliminating infiltration and inflow entering the sewer systems from government-owned properties.
- 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.
- 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.
- 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.
- 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.

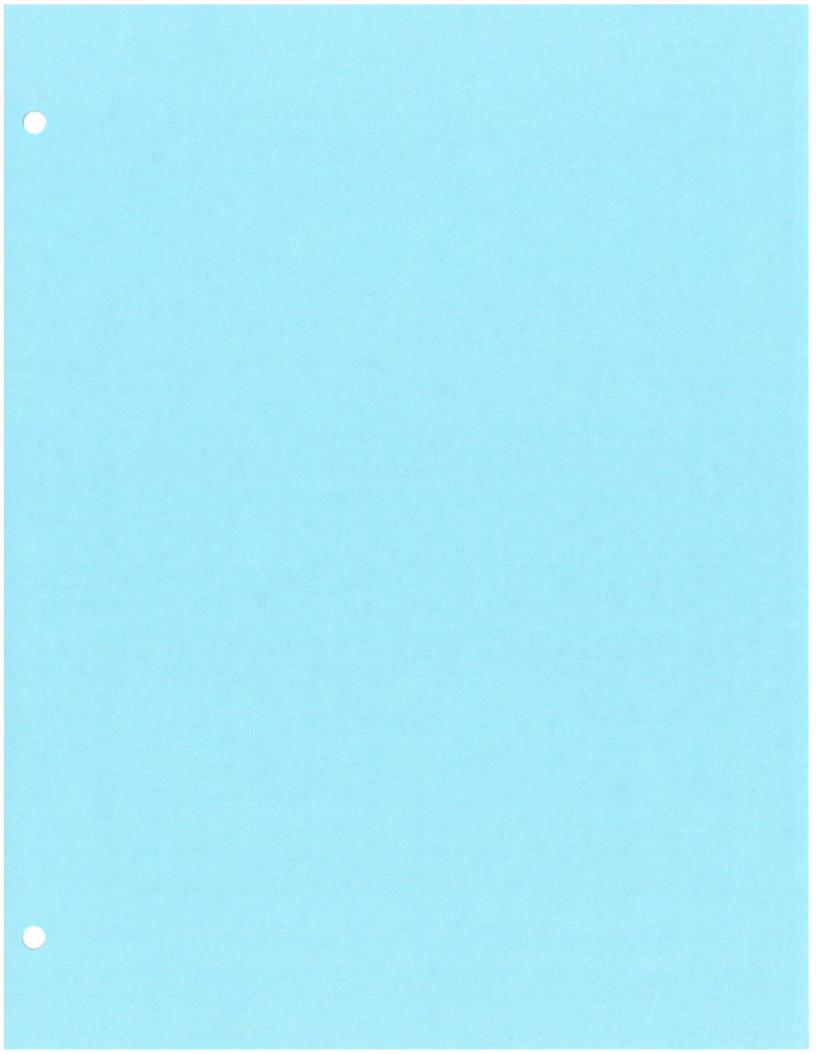
## B. MSD Actions Not Related to Sewer Overflow Issues

- 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

- Heine Brothers Coffee is looking for five acres for an urban farm to grow produce and sell to local restaurants.
- 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.
- 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-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.
- (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.
- (1-C-18) Develop an educational facility (potentially near MSD's office) similar to the Northern Kentucky Sanitation District No. 1 "Public Service Park" (<a href="http://www.sd1.org/psp/psp.asp">http://www.sd1.org/psp/psp.asp</a>), 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.
- (1-E-5-b) Support a volunteer monitoring program to monitor water quality in streams across the county.
- (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

DRAFT: 6/11/08

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

 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 <u>communication media</u> 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. <u>e-mail lists ("UofL announcements" to University of Louisville employees, e-mail lists for Metro Council members)</u>
  - 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
  - 5-minute <u>DVD video</u> (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)
  - hold a <u>speaker's forum</u> and/or have a group of people available that could speak at community meetings and events
  - m. work with the <u>Mayor's press staff</u> and the <u>Louisville Metro Neighborhoods Department</u> 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
  - 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 <u>door-to-door outreach</u>, to better understand local water quality problems and to solicit local input on potential solutions.
- 4. Develop a <u>speakers bureau</u> to attend chamber/business association meetings and other groups that use speakers.

- 5. Conduct <u>demonstration projects</u> (Note: Overlaps with demonstration projects in Solution Ideas List). Specific ideas include:
  - a. Create a <u>demonstration area</u> 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 vour 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.
- Support the identification of <u>public watershed advocates</u> 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.
- 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.
- 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.
- 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.
- 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.
- 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 <u>portal to MSD's website</u> 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 <u>information booth</u> 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" (<a href="http://www.sdl.org/psp/psp.asp">http://www.sdl.org/psp/psp.asp</a>), 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.
- 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.
- Discourage chemical treatment and mowing near waterways to help keep debris from waterways.
- 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).
- 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 <a href="http://www.watershedpledge.org">http://www.watershedpledge.org</a>
- 5. Encourage the use of best management practices for chemical use in lawn management practices.
  - Inform greens keepers about best management practices (BMPs), since non-point source runoff is made worse by golf course chemicals.
- 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.
- Establish a recognition program for neighborhood efforts to implement, maintain, and monitor green infrastructure projects.

# E. Monitoring, Evaluation, and Accountability

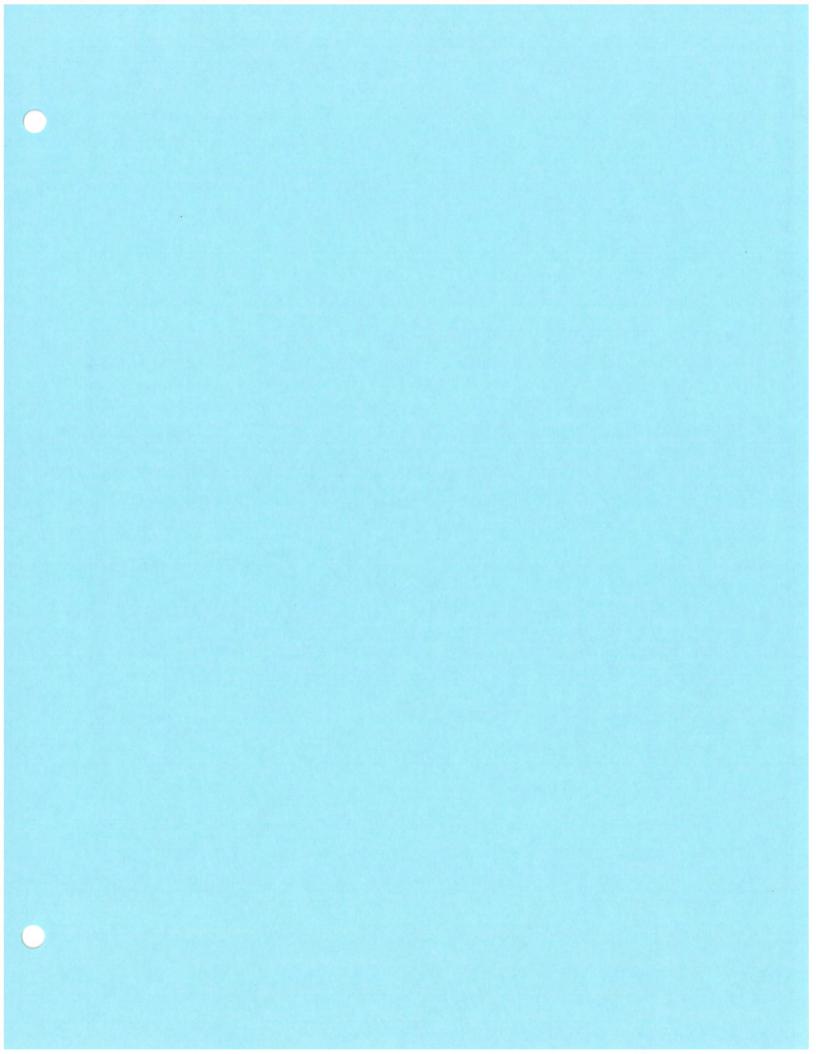
- Conduct a baseline survey and follow-up surveys of residents to determine whether education and outreach efforts are effective in raising awareness and in changing behavior and perceptions on issues related to the Wet Weather Program. [Note: This is also included in the Solution Ideas List.]
  - a. Develop a survey instrument (potentially with a coalition of cities) and use it every year.
- 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.
- 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.
- Support volunteer monitoring efforts.
  - Support efforts such as those practiced by the Salt River Watershed Watch program (http://kywater.org/watch/salt/).

- 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.
- 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)

- (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).
- (II-A-6-b) Support a volunteer monitoring program to monitor water quality in streams across the county.
- (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.
- 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.]
- 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

- Information on the long-term effectiveness of strategies that rely on source prevention (e.g., rain gardens).
- Quantitative information on the benefits and/or effectiveness of eco-friendly solutions currently used by MSD.
- 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.
- 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

- Conduct assessments of different watersheds to find the best opportunities for green infrastructure.
- Conduct additional analysis of the potential effects of behavior change and green infrastructure strategies at reducing flows into MSD's sewer systems.
- 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]
- 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.
- Involve experts in making financial decisions, given the relationships among the timing of projects, cash flows, bond rating, and other factors.
- Include information on the amount of debt remaining to be paid after the Consent Decree implementation period in future funding presentations.
- 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

- 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
  - 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
- 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

- 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.
- 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

 Conduct separate research and data analysis to supplement any data collected through surveys about people's behavior.

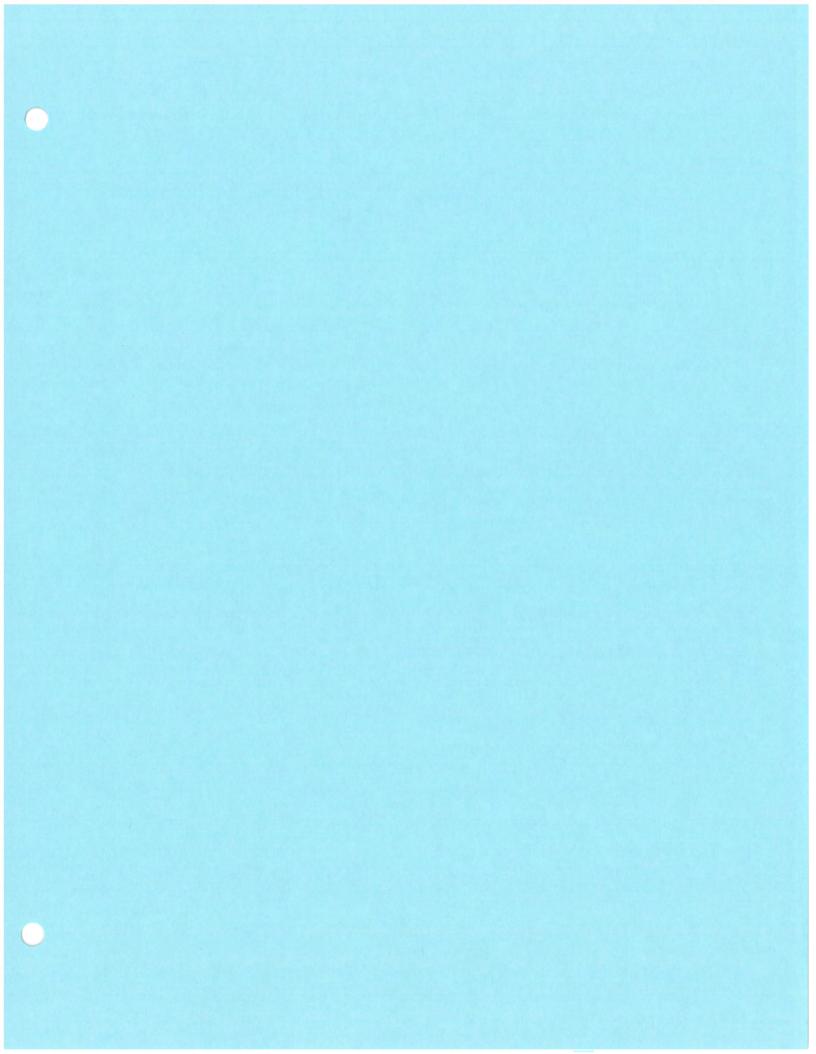
# D. Suggestions Related to the Presentation of Information in the Wet Weather Plan

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

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 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.]

EPA's Combined Sewer Overflow Control Policy is available at http://cfpubl.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;
- Promote public acceptance and support for the financial investments required to achieve consent decree and Clean Water Act compliance; and
- 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 1&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. 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

<sup>&</sup>lt;sup>2</sup> For more information about the Cornerstone 2020 plan, see <a href="http://www.louisvilleky.gov/PlanningDesign/Cornerstone+2020.htm">http://www.louisvilleky.gov/PlanningDesign/Cornerstone+2020.htm</a>.

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

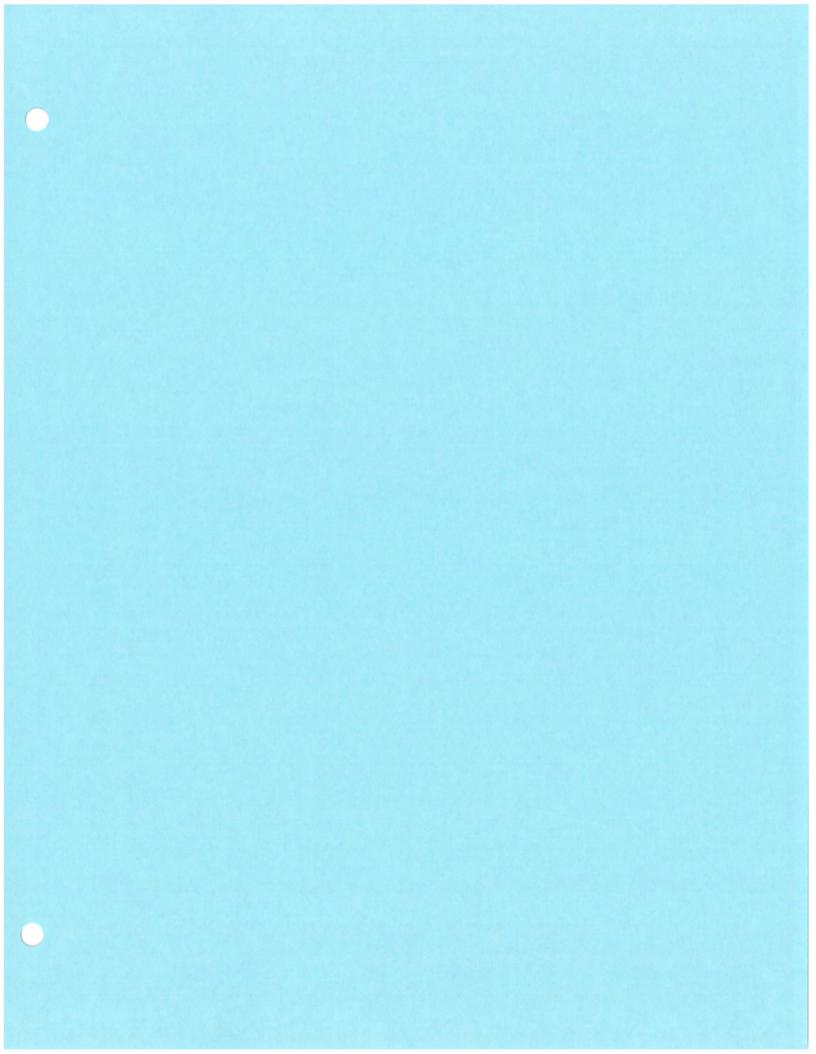
Continued development in the community will require MSD to implement measures to reduce wetweather flows. As currently conceived, MSD proposes a three-to-one offset of wet-weather flows from new development. This means that flows entering MSD's sanitary sewer systems will be reduced at a ratio of three 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

<u>Description:</u> 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

<u>Comment #1</u>: 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.

<u>Comment #3</u>: 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

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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

<u>Comment #1</u>: 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.

<u>Comment #2</u>: 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

<u>Comment #3</u>: 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?

<u>Comment #4</u>: 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."

<u>Comment #7</u>: 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

<u>Description</u>: 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

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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

<u>Comment #1</u>: 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?

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

<u>Comment #5</u>: 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?

<u>Comment #6</u>: 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

<u>Description</u>: 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

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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.

<u>Comment #2</u>: 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.

<u>Comment #4</u>: 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

<u>Description</u>: 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<sup>1</sup> sets specific abatement targets for CSOs. To be permitted, wet-weather CSOs must be controlled so that either water

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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.

<u>Comment #2</u>: 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

<u>Description</u>: 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.

<u>Comment #2</u>: 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.

<u>Comment #3</u>: 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.

<u>Comment #5</u>: 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

<u>Description</u>: 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.

<u>Comment #2</u>: 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?

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# 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

<u>Comment #1</u>: 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

<u>Description</u>: 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

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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%.

<u>Comment #2</u>: 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

<u>Description:</u> 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

<u>Comment #1</u>: 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.

<u>Comment #2</u>: 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.

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# 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. 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

<u>Comment #1</u>: 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.

<u>Comment #2</u>: 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

<u>Description:</u> 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

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...

<u>Comment #3</u>: 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.

<u>Comment #4</u>: 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.

<u>Comment #3</u>: 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?

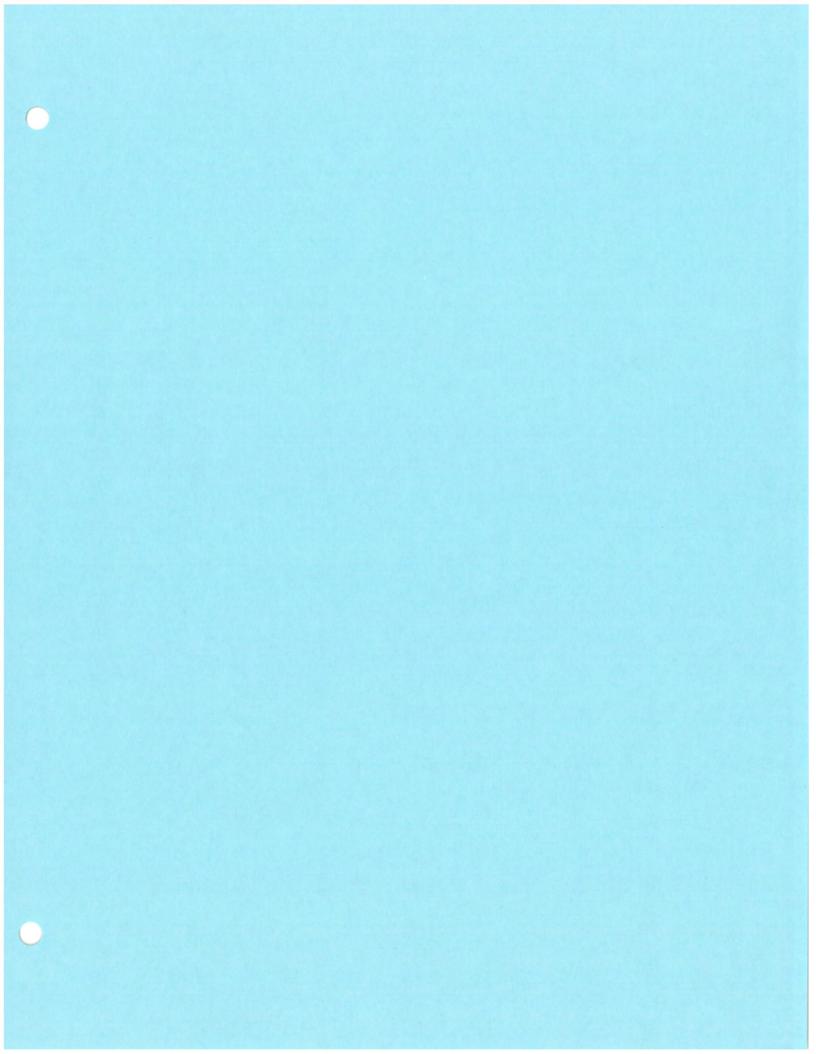
ON slide 15, you have a book or a poster called Project Win Presents kid Win - This is the first time. I have seen that the education part was going to include writing a book. I have not seen that in any of the descriptions nor minutes of the education. I think the education program has to be much better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

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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.





# NEWS RELEASE

# FOR IMMEDIATE RELEASE

June 17, 2008

2008 OHIO RIVER SWEEP SET FOR SATURDAY, JUNE 21

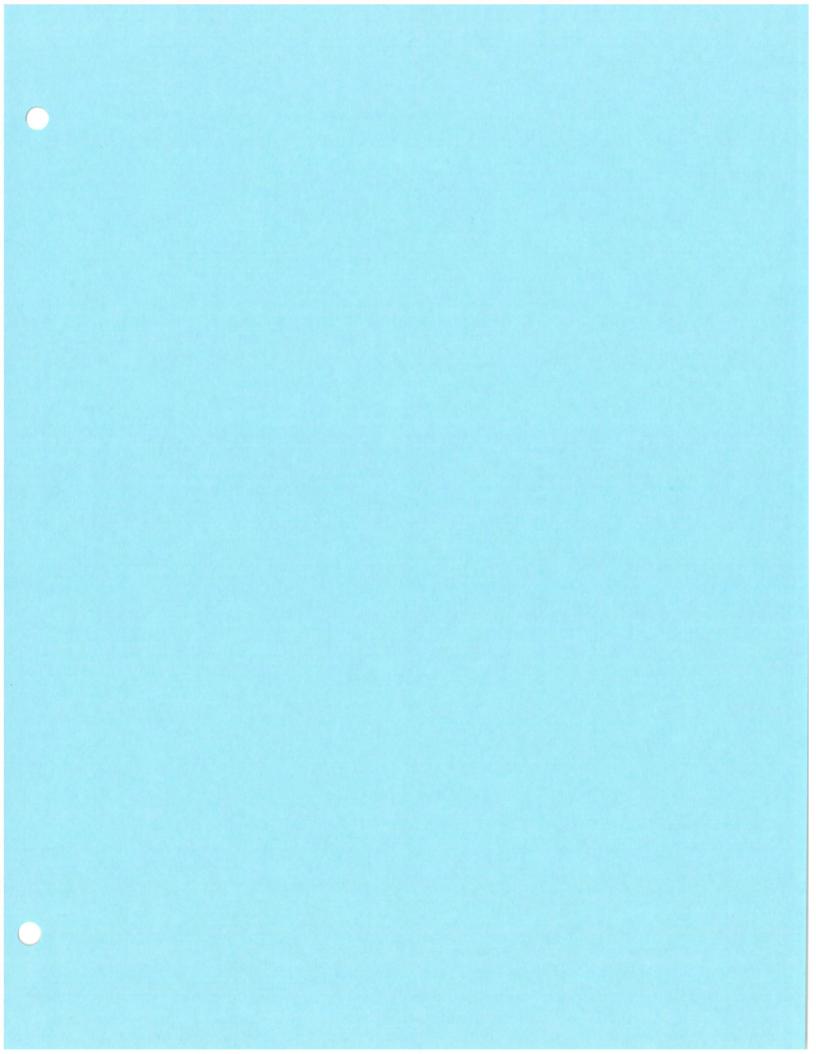
The 19th annual Ohio River Sweep is set for Saturday, June 21, from 9:00 A.M. to 1:00 P.M. More than 15,000 volunteers from Pittsburgh to Cairo, Illinois will pick up trash and debris along 1,800 miles of riverbank. Six states and 72 counties are represented.

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)
- Juniper Beach Area (Public)
   Lime Kiln Lane at River Road (Fire Station)
- Cox Park (Public)
- 4. Eva Bandman Park (Public)
- Riverwalk (Public)
   10th and Main Streets
- Shawnee Park (Public) Broadway at the River
- 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.



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 sewe 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
Control of the Contro	Middle-Fork-Beargrass-	Linear Marian	PROJECT DELETED DUE TO	AND THE PROPERTY OF	000105 000105 000107 000108		0.00		0.00
L_MI_MF_126_M_10_B_B  L_MI_MF_126_M_13_B_A	Greek  Middle Fork Beargrass Creek	Treatment Facility  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 applicable page	NOT YET REVIEWED  Available CSS storage capacity is based on June, 2041 BPR BTC Study. Flow Control assumes infialable dams are available at the time of construction. Down-sized storage basin design with Figw Control assumptions are same as Off-line Storage technology.	CSO125, CSO126, CSO127, CSO166  CSO125, CSO126, CSO127, CSO166	\$0.30	32.48	\$0.00	<del>0.00</del> 34.58
WI_MF_127_M_09B_B_A	Middle Fork Beargrass Creek	Off-Line Storage	This project is to provide a 4.33 off-line storage facility consisting of a small open concrete basis (0/41 MG) followed by a large earthen storage (04sin 3.7 MG) for	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 Middle Fork Beargrass	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.  PROJECT DELETED DUE TO	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	Greek	Treatment Facility	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	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
1 141 14E 140 M 10 B A	Middle Fork Beargrass Greek	Treatment Facility	PROJECT DELETED DUE TO: RESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	CSO086, CSO140		0.00		0.00
L_MI_MF_140_M_10_B_A  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	LF of 15" pipe in street, 355 LF of 15" pipe out of street and	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_098_8_A	Middle Fork Beargrass Greek	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	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	31.0
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	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.		CSO132, CSO167		0.00		0.00
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		0.0
	Muddy Fork Beargrass Creek	Off-Line Storage	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_09B_B_A	Muddy Fork Beargrass Creek	Treatment Facility	This project includes a 7.19 MG underground covered storage basin for CSOs 132 & 167. The facility will require	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes a renour storage at the head of the plant.	CSO132, CSO167	\$0.62	13.29	\$0.54	15.34
L_MU_MF_132_M_13_B_A	Muddy Fork Beargrass Creek	RTC with Storage	This project includes a 7.19 MG upderground 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 MGH. S using an intiatable gate in the Brownshore Boad Think Sewer.	AVailable CSS storage capacity is based on June. 2001 BPF RTC Study. Flow Control assumes inflatable ams 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
	Muddy Fork Beargrass Creek	Off-Line Storage	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	surroundings.	CSO132, CSO154, CSO167	\$0.26	22.44	\$0.24	24.36
L_MU_MF_154_M_10_B_A	Muddy Fork Beargrass Creek	Treatment Facility	This project is to provide a 81 MGD RTB High Rate Treatment Facility for CSOs 132, 154 and 167, Annual	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.	technology.	CSO132, CSO154, CSO167	\$0.29	20.09	\$0.27	21.
_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.
MU_MF_154_S_10_B_A	Muddy Fork Beargrass- Greek	Treatment Facility	PROJECT DELETED DUE TO- RESIDENTIALMEIGHBORHOOD IMPACTS	NOT YET REVIEWED	-CSO154		0.00		0.4
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		0.0
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	6.2
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	0.0
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 Offline Storage technology.	CSO015, CSO191	\$0.15	7.68	\$0.13	8.36
_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	NOT VET REVIEWED	CSO019		0.00		0.00
OR_MF_019_S_09B_B_A		Off-Line Storage	This project includes a 4-54 in a underground covered concrete basin for CSO 219. The facility will require a 14.5 MGD PS to return the stored to back	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.	assumes inflatable dams are available at the time of construction. Down-sized storage basir 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 fo the Starkey PS and CSOs 20 & 62 for an estimated cost of \$512,000 (2003 \$s).	NOT YET REVIEWED	CS0020, CS0062		0.00		0.00
L OR_MF_026_S_08_A_A	Ohio River	Sewer Separation	This project include construction of a new storm sewe 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		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_\$_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
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

O'Brien and Gere

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			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	There's approx. 121 properties impacted by this project. The design flow would be developed in					
L_OR_MF_029_S_08_A_A	Ohio River	Sewer Separation	consists of 925 LF of 21" pipe in street.	accordance with the MSD Design Manual.	CSO029	\$0.44	54.68	\$0.36	67.9
L OR MF_030_S_08_A_A	Ohio Ríver	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 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	CSO030	\$0.23	112.30	\$0.19	136.8
_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.	C\$0031		-221.11		-268.8
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 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	42.1
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
00 M2 000 0 00 A A	Only Stray	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
_OR_MF_050_S_08_A_A	Ohio River		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"	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
_OR_MF_051_S_08_A_A	Ohio River	Sewer Separation		There's approx. 31 properties impacted by this project. The design flow would be developed in					
_OR_MF_052_S_08_A_A	Ohio River	Sewer Separation	street. The storm system consists of 10 LF of 36" pipe	There's approx. 103 properties impacted by this project. The design flow would be developed in	CSO052	\$0.13	114.62	\$0.10	144.86
OR_MF_053_S_08_A_A	Ohio River	Sewer Separation	in street.	accordance with the MSD Design Manual.	CSO053	\$0.13	303.63	\$0.12	349.81

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L OD ME OF COM 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_054_S_08_A_A	Ohio River	Sewer Separation	This project includes the construction of a naw sanitary sewer system ecosisting of 55 LP of 5 pipe in street.	rinere's approx. 73 properties impacted by this	CSO055			\$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.	project. The design flow would be developed in	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.	d There's approx. 297 properties impacted by this	CSO058	\$0.02	199.32	\$0.01	252. <u>6</u> 9
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
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
_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	Available CSS storage capacity is based on June, 2001 BPR RTC Study. Flow Control	CSO104, CSO105, CSO189	\$0.20	10.85	\$0.18	11.96

Project!D	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	Welght Benefit / Cost Ratio (Total Present Worth Costs)
L_OR_MF_105_M_04_B_A	Ohio River	Flow Cantrol	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		0.0
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 dos of \$7,434,000 (1997 \$s).	Treatment facility design rate based on hourly hydrographs or 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 sorm sewer system consisting of 2,925 of 127 tipe 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.	ÇSO172	\$1.26	22.36	\$1.86	28.05

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			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.
_OR_MF_172_S_09B_B_A	Ohio River	Off-Line Storage	PROJECT DELETED DUE TO						
OR_MF_172_S_10_B_A	Ohio River	Treatment Facility	RESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	CSO172		0.00		0.0
_OR_MF_178_S_08_A_A	Ohio Ríver	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.:
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	9.1
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		0.0
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	8.0
	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	4.7
OR_MF_189_S_10_B_A 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.	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
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	Basins are designed to the 5th overflow event volume, resulting in 4 CSO overflows/year. The 5th peak flow ate is evaluated to compare gravity vs. pumped conveyance. Design for pumped ack is 24 hours. Type of basin based on hydraulics and surroundings.	CSO190	\$0.30	23.92	\$0.28	25.27

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		111275	Busines Businesias	Project Assumptions	CSOs Associated with the Project	Capital Cost / Gallon Overflow Removed	Weight Benefit / Cost Ratio (Capitol Costs)	Worth Cost/ Gallon Removed	Present Worth Costs)
<u>ProjectiD</u> _OR_MF_190_S_10_B_A	Receiving Waters Ohio River	ProjectType  Treatment Facility	This project is to provide a 27 MGB RTB High Rate Treatment Facility for CSO 190. The basin is located in a vacant lot near 1-64. Annual volume stored is approximately 36 NIG operated 50 times per year	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes ≥ 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		\$0.43	
_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 520 LF of 15" pipe in street.	t, There's approx. 64 properties impacted by this	CSO192		-62,14		-76.1
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	114.5
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
_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
_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
_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
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.		CSO202		0.00		0.00
_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

Designation	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)
ProjectID  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).	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	1 Togradu	NOT YET REVIEWED	ÇSO211	\$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 initiatable 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 and aground open concrete basin for CSO 211. The basin is on MSD property near I-264. The facility is a grevity 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/NE GHEO/RHO/DD IMPACTS	NOT YET REVIEWED	CSO211		0.00		0.00
Start here for SF  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	o	o	CSO018, CSO108, CSO109	\$1.85	3.78	\$1.57	4.43

						Capital Cost / Gallon Overflow	Weight Benefit /	Present Worth Cost/ Gallon	Weight Benefit / Cost Ratio (Total Present Worth
ProjectID	Receiving Waters	ProjectType	Project Description	Project Assumptions	CSOs Associated with the Project	Removed	(Capitol Costs)	Removed	Costs)
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 facili 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.	CSO082, CSO083, CSO084, CSO091, CSO092, CSO110, CSO111, CSO113, CSO117, CSO118, CSO119, CSO120, CSO121, CSO141, CSO146, CSO148, CSO149, CSO151, CSO152, CSO153, CSO179	\$0.42			41.
<u>L_SO_MF_082_M_10_B_A</u>	South Fork Beargrass- Creek	Treatment Facility	PROJECT DELETED DUE TO RESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	CS0082, CS0083, CS0084, CS0081, CS0092, CS0110, CS0111, CS0113, CS0117, CS0118, CS0119, CS0120, CS0121, CS0141, CS0146, CS0148, CS0149, CS0151, CS0152, CS0153, CS0179		0.00		0.6
L SO MF 082 M 10 B B	South Fork Beargrass- Creek	Transport France	PROJECT DELETED DUE TO				14.3		
2_30_WF_002_W_10_5_8	Greek	Treatment Facility	RESIDENTIAL/NEIGHBORHOOD-IMPACTS	NOT YET REVIEWED	CSO082, CSO120, CSO121, CSO152		0.00		0.0
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		0.0
t and the last service in a	South Fork Beargrass		PROJECT DELETED DUE TO	To a second seco	THE RESERVE THE STATE OF THE ST				
L_SO_MF_082_M_10_B_B	Creek	Treatment Facility	RESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	CSO082, CSO120, CSO121, CSO152 CSO082, CSO083, CSO084, CSO091,		0.00		0.0
SO_MF_082_M_10_B_C	South Fork Beargrass Creek	Treatment Facility	PROJECT DELETED DUE TO PRESIDENTIAL/NEIGHBORHOOD IMPACTS	NOT YET REVIEWED	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	41.7
L_SO_MF_083_M_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	This project includes an 9.45 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.	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.	which typically allows gravity conveyance, plus	CSO082, CSO083, CSO084, CSO118, CSO119, CSO120, CSO121, CSO141, CSO153	\$0.33	29.07	\$0.00	32.10
_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	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
_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.	project. The design flow would be developed in accordance with the MSD Design Manual.	CSO091	\$0.25	27.33	\$0.23	29.82
SO MF 092 M 09B B A	South-Fork Beargrass Greek	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	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.	CS0092, CS0113, CS0146, CS0152	0,2648	30.68	0.244	<del>33.31</del>

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	South Fork Beargrass	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.	CSO082, CSO113; CSO162	0.2639	48.99	<del>0.239</del>	54.1
L_SO_MF_092_M_09B_B_B  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	CSO092, CS0113, CSO117, CSO142, CSO149, CSO152, CSO174, CSO179, CSO180, CSO182, CSO183, CSO184, CSO185, CSO186, CSO187, CSO188, CSO205		0.00	v	0.0
	South Fork Beargrass	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_A	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.	Flow Control assumptions are same as Off-line Storage technology.	CS0113, CS0117, CS0149, CS0152		-50.23		-57.98
L SO MF 092 S 08 A_A	South Fork Beargrass Creek	Sewer Separation	This project includes the construction of a new storm sewe system consisting of 970 LF of 12" pipe in street plus 665 LF of 12" pipe out of street.	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 sewe system consisting of 2,905 LF of 12" pipe in street plus 350 LF of 12" out of street.	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		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 098 B B	South Fork Beargrass	Off-Line Storage	This project includes the construction of an 6.73 MG off-line underground storage basin for C30s 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 098 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
SO_MF_097_M_10_8_A	South Fork Beargrass Creek	Treatment Facility		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	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

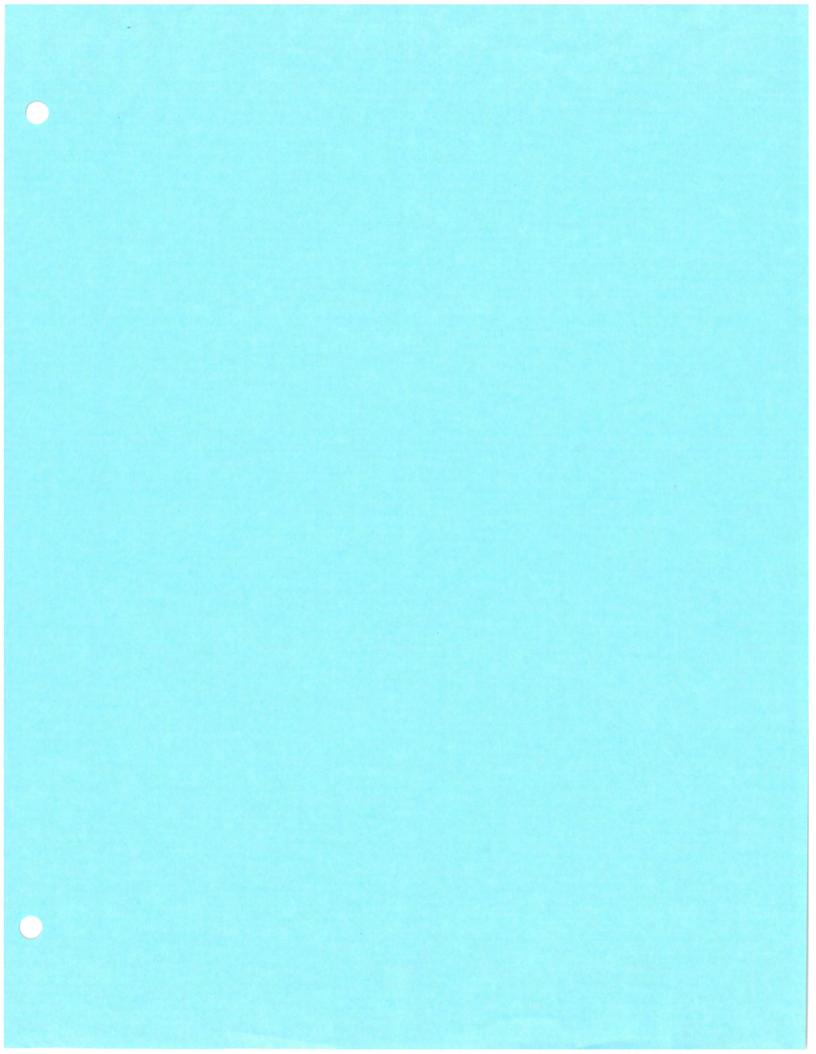
O'Brien and Gere

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_SO_MF_106_S_08_A_A	South Fork Beargrass- Creek	Sewer Separation	This project includes the construction of a new storm sewe 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 approxproperties impacted by this-	CSO+06		0.00		0.0
A CO ME TOO C ODA B A	South Fork Beargrass Creek	In-line Storage	NOT YET REVIEWED	NOT YET REVIEWED	CSO108	\$1.67	17.13	\$1.61	17.8
L_SO_MF_108_S_09A_B_A	South Fork Beargrass- Greek	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 ovaluated to compare gravity vs. pumped conveyance. Design for pump-back is 24 hours. Type of basin based on hydraulics and surroundines.	CSO108		25.08		28.38
L_SO_MF_108_S_09B_B_A	South Fork Beargrass Creek	Off-Line Storage		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		\$0.32	80.39
L_SO_MF_111_M_09B_B_A	South Fork Beargrass Creek	Off-Line Storage	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	stored flow to the interceptor over a 24 hour period. (CSO 111 had 0 AAOV)	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 IGD THE High Plata Treatment Facility for CSOs 97, 106, 10, 11, 14, 148 113 and 151. Annual volume stored is asproximately 133.39 MG. operated 59 times per year	Tratment facility design rate based on hourly hydrographs for 5th peak flow rate event. BF includes 24-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
SO_MF_117_M_09A_B_A	South Fork Beargrass Creek	In-line Storage	The RTC Program identified the installation one control gate and 3 inflatable runber gates in this area to achieve 3.2 MG of in-line storage for an estimated cost of \$2,520,000 (2003 Ssi	NOT YET REVIEWED	CSO117, CSO149, CSO179	0.2521	23.35	0,2309	25.49
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	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
_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)	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	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	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.	facilities.	CSO117, CSO149, CSO179		0.00		0.0
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	40.6
L SO_MF_117_M_13_B_A	South Fork Beargrass	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.	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_098_B_A	South Fork Beargrass	Otf-Line Storage	This project includes an 7.42 MG off-line covered storage basin for CSOs 83, 84, 118 & 119 to reduce overflows to 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.	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	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	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.	CS0083, CS0084, CS0118, CS0119		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 BTC Program.	NOM YET MEVIEWED	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	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 4.92 MG office tovered storage basin for CSO 118 and 0.8 MG of IUS at CSO 118 to reduce overflows to no more than 4 per year. The basin will require an effluent plant status to return stored flow to the interceptor.	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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	South Fork Beargrass	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.
_SO_MF_130_S_08_A_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		\$8.18	0.00	\$7.55	
_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.	C\$O130	\$66.86	1.50	\$53.02	1
. 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.
_SO_MF_141_S_08_A_A	South Fork Beargrass Creek	Sewer Separation	This project includes the construction of a new storm sewe system consisting of 510 LF of 12" pipe in street plus 515 LF of 15" pipe in street.	r 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.
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
SO_MF_151_M_09B_B_B	South Fork Beargrass Creek	Off-Line Storage	The facility will require a 5.23 MGD effluent PS to return the	pumped conveyance. Design for pump-back is 24	CSO110, CSO111, CSO148, CSO151	\$0.30	21.60	\$0.27	23.
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 149, 111, 8, 131. The facility will require a 5.14 MGD efficient 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	CSO110, CSO111, CSO151	\$0.31	0.00	\$0,28	0.
SO_MF_151_M_09B_B_C	South Fork Beargrass	Treatment Facility	This project is to prove a 57.5 MGD/FTS High Rate Treatment Facility for CSOs 97, 108, MO. 137, and 151. Annual volume stores is approximately 125.67 MG, operated 50 times per year.	Treatment facility design rate based on hourly hydrographs for 5th peak flow rate ovent. 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 facilities.	CSO007, CSO106, CSO110, CSO111, CSO137, CSO148, CSO151	<del>0.2181</del>	0.00	\$0.20	0.0
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	0.0
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	0.0

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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	45.6
L SO MF 153 M 098 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		0.0
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.		CSO174	\$0.00		\$0.00	0.0
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			To Be Determined	To Be	To Be Determine
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		This project includes evaluating operational procedures for t 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		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



#### **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 It.S between PREPS and SGC in SWO. The basin is located east of 1264 adjacent to MSD property. The facility is gravity in gravity out openation.

Estimate Date: 6/19/2008

Prepared By: PHS/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	\$	16	
Estimated Screening Cost	\$		
Misc. Extra Cost Description: deep excavation	\$	5,000,000	
Total Estimated Construction Cost =	\$	34,022,000	

Real Estate Costs D	Description	in the second	T	otals
Easement Cost	# of Properties =	0	\$	
Property Acquisition			\$	
Misc Extra Cost	Description		\$	
	Total Addit	ional Costs =	\$	11.

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 -	5 54 947.00u

For Economy of Scale when dealing with the facility worksheets for a facility whose size is fall 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	s	59.558.424					

PTO(\$ Summary 1/2)

PROJECT CAPITAL COST ESTIMATE =

Project 20 Year Present Worth Estimate = Construction Cost Estimate =

\$ 60,478,676
\$ 59,558,424
\$ 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

LW = 1.0 # 1000 = 0.1=

Pon d Amoromy



# CSO LTCP Initial Solutions Project Fact Sheet



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 PREPS 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

No major utility conflicts.

Description:

Capital Projects:

2009~FY08/09 CD-1 Drainage Improvement - Awaiting Start; 2013 Campground Rd. @ Cabe Run Rd., RYC @

Southwestern Outfall (SWOR1)

Estimated Capital Cost

564,834,844

(2010 dollars):

Capital Cost / Gallon Overflow Removed: 50 15

Weighted Benefit / Cost

7.68

Ratio (Capital Cost):

#### Overflow Points Addressed:

CSO Number	CSO Name	2008 AAOV (MG / Yr)	Number of Overflow / Yr	CSO Area (Acres)
C50015	Southwestern Pump Station	194 56	51	7,496.70
CSO191	Algonquin Parkway Sanitary Diversion	32.42	19	339.75

NOTE that substitutes are a state of the sta

1	
}	

#### OPEN CUT SEWER CONSTRUCTION VALUE ENTRY SHEET

Proj	ect	ID:	L	OR	MF	015	M	13	В	A	

Estimate Date 16/19/2008

Printed Date: 6/19/2008

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

Segment ID	*Plpe Size (In)	Length of Pipe in Street (ft)	of Street	**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	Surface	Small Medium or Large Creek Crossing (S.M. or L)	Sewer in Rock	Dewatering Required	Maintenance of Flow	sp	Clearing and Grubbing	Traffic Maintenance Required		otal Cost Per Segment
U15-Basin	132	0	10	25	0	.0	3,7	0	U	- 0-	1	0								5	152,469
015-Basin	132	0	10	25	0	0	0	0	0	0	1-	0			X					5	152,469
Basin Int.	78	U	10	25	0	0	12	-0-	0	- 0	1	0			X					\$	144.927
	0	0	0	0	0	0	U	0	0	0	0	0								\$	
	- 0	0	U U	U	U	- 0	3.1	- 0	U	- 0	IJ.	17								\$	
	0	0	0	0	0	0	U	0	0	O.	0	U								\$	
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	U	0	0	Ū	0	0	0	0	- 0	0		U				$\rightarrow$		_	_	\$	•
	0	0	0	D	0	0	- D	()	0	-0	0	0				4	- 1			1.5	

		Total Cost for Construction = \$	449 866
30	= Total Length of Open Cut Job	Small Job Multiplier =	58%
D	= Total Length of Sanitary Sewer in Rock		
		Estimated Total Sewer Construction Cost = s	710,009

I DR ME 015 M 13 B A Costest R1 x/s Open Cut Sewer 171

<sup>\*\*</sup> 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 Torrielling 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/FWK, OBG & GTB, HDH

Segment ID	*Pipe Size (in)	Length of Pipe (ft)	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 Segmen
191 Basin	78	1 000	40	1	1		0	0		A					_	X				\$ 2,934,591
	0	0.	0	0	0	0	0	0	-		_	$\Box$			_	_	-			\$
	U	0	()	0	0	Ü	0	Ü												5
	- 0	0	0	0	.0	0	()	0	-	-				-	-	-	-			\$
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	.01	0	0	U.	0	(0)	Ω	(36)												\$

		Total Cost for Construction =	5	2.934 591
1,000	= Total Length of Tunnel Job	Small Job Multiplier =		32%
		Estimated Total Tunneling construction Cost = \$		3,882,463

I WH ME DIS MILE & CONTEST HE NO

Funnel Sewer 1/1

<sup>Use standard pipe sizes
Auger Bore maximum depth of 25 feet</sup> 

#### 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							\$
141	0	0	0							\$
	0	0	0							\$
-	0	0	0							5
	0	0	0							\$
	0	0	0						-	\$
	0	0	U							\$
-	0	0	0							\$
	0	Ü	0							S
	0	0	0				-			\$
	0	0	0							\$
-	0	0	0							\$
	-0	1 //	0.	1						¢.

#### 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.

LUH ME DIS M 13 B A COSTEST HEAS

Off Line Storage 1/1

#### 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

	TYP	E (Ch	HOOSE ONE)		1								
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	Х		16	45	19.8	250	60	x				-	\$ 2,642,998
ILS		Х	108	45	0	0	0				- 1		\$ 112,624
С			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

FlowControl-1/1

<sup>\* -</sup> 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	<b>Dewatering Required</b>	Brownfields	Exclude Structure (-%)	Total Cost Per Facility
Basin	0	0	0							0%	\$
ILS	45	45	20							0%	\$ 4,294,30
C	0	0	0							0%	\$
D	0	0	0							0%	\$ -
	0	0	Ď.	T						0%	\$

Enter Description if Exclude Structure -% used:

Estimated Total Pump Station Construction Cost = \$

4,294,307

Pump Stations-1/1

<sup>\*</sup> 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

<sup>\*\* -</sup> Cost per linear foot increases at depths of 20, 50, 100 and 150 feet

<sup>\*\*\* -</sup> 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)	Pipe out of	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		tal Cost Per Segment
ILS	18	0	7,200	10	0	0	0	5					8		\$	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	Ü	- 0							\$	
F	0	0	0	0	0	0	0	O				_	_		\$	
G	0	0	0	0	0	0	0	- 0				_	-		\$	
Н	0	0	0	0	0	0	0	0				_	_	-	\$	
The second second	0	.0	0	0	Ú.	- 0	D.	0							\$	
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Q 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		-	-	-	-	-	\$	
Ü	0	1)	0	0	-0	0	0	0			-	-	+	+	\$	
V	0	0	0	0	0	0	0	0			-	+	+	+	\$	
W	0	D	0	0	0	0	0	0		$\rightarrow$	1	$\rightarrow$	-	-	5	
X	0	0	0	0	0	0	0	0		-	-	+	+	-	\$	
Ÿ	0	0	-0	0	0	0.	0	0		-	-	$\rightarrow$	+	-	\$	

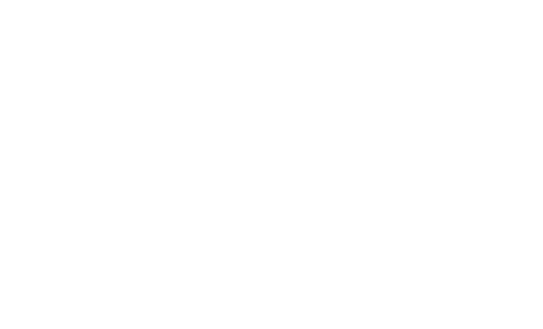
\*Note - pipe sizes range from 6" to 54". If a larger forcemain may be required it is recommended that the estimator cost out dual forcemains of smaller diameter.

14 400 = Total Length of Force Main

Estimated Total Force Main Construction Cost = \$

2,162,012

L OR MF 015 M 13 B A CoslEsi H1 xis



#### Cluster Comparison

L OR MF 015 M 13 B A

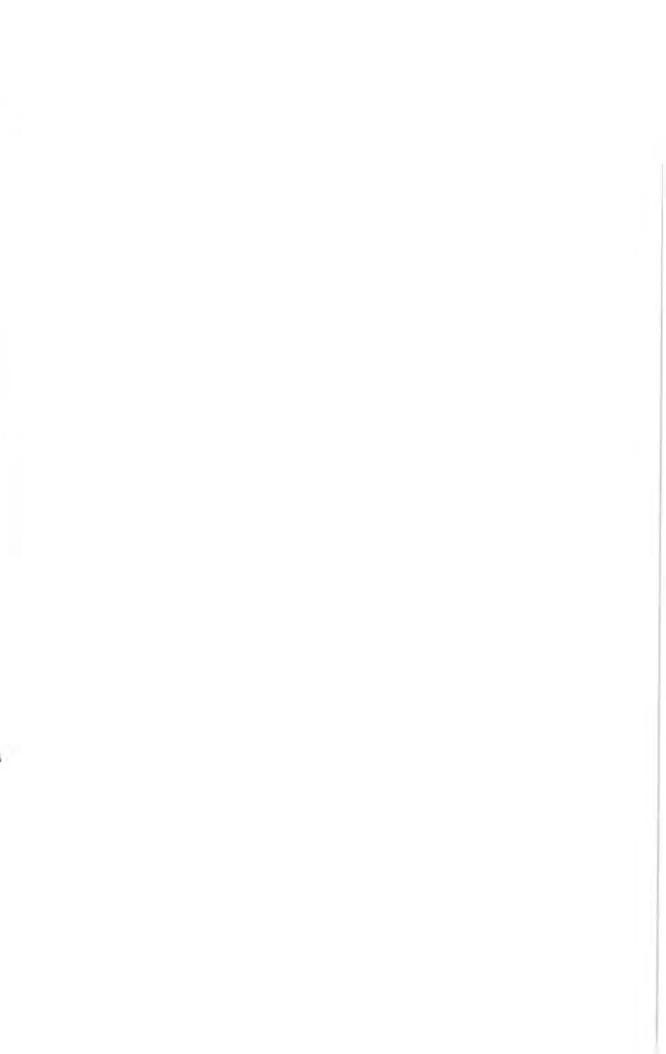
Raw Benefit Score<sup>2</sup>

CSO/SSO ID		Regulatory Performance	Public Health	Asset Protection	Environmental Enhance	Eco-Friendly Solutions
015		13	13	0	9	-8
191		12	12	O	9	-8
				0	0	0
				0	O	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 <sup>3</sup>	\$64,834,844					
Total Present Worth Costs <sup>3</sup>	\$59,558,424					
Weighted Benefit/Cost Ratio (Capital Costs)	7.6811					- 19
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.

Benefit CostTool v6 015 M R3 xis Cluster Comparison 4/5





MSD CSO
Long Term Control Plan
L\_OR\_MF\_015\_M\_13\_B\_A



## DRAFT

#### 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.

Aenal Date 2006

Graphic Date Jun 19 2008

1 inch equals 400 feet





MSD

ue:	Asset Pro												
		Measure				Im	pact			Rationale	Me	asurement Metho	od
		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.	MSD Customer Informat	available historic custome iton System or historic obs with the expected relative in storm water flows	ervations of floor
se Measures		Basemen	t 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 whydraulic grade lines con manholes	vill be via hydraulic models npared to ground surface e	to quantify the levations at
Performance	Storm Events		-	Most Severe Impact				Least Impact	No Impact				
Per		7		5	4	3	2	1	C	Assumptions	Base Case Score	Alternative Score	Total Scor
	6 Month	Most	5	25.	20	15	112	=	93	8 95% of manholes surcharged	1,5	15	0
	1 Year		4	50	16	12	1.8	1	Ċ	9 95% of manholes surcharged	12	12	0
Frequency	2 Year		3	15	12	g	6	i	Ē	14 55% of manholes surcharged:	12	12	0
Freq	5 Year		2	10	8	6	-		ă.	27 02% of manholes surcharged.	10	10	Ó
	10 Year	Least	1	5	-	â	ž)			56.05% of manholes surcharged.	5	5	0
	Not Possible	Not Possi ble	0	2	2	2	6'	8		Tota	Score		0

L OR MF Value:	015 M 09B B A		M 13 B A										
value;	Environmental	Linancement					S	ionno					
Aspec:	- 3	4	3)			-6	30	1			- y	Assumptions	Score Per Aspe
Aquatic and Terestrial Habitat Protection	Elimination of habitation care encangaries sciences	anguel of cerebo header	Estudiación of minuti amount of certimon facilie	Significant library reservoir	William resourced it seems	No impact or habitar	Ming entigroprison of easing highlar	Significant of the person of t	2 Charge (I month sound) Listenion habita	S-later III light care lattle of common habital	Contact of the Nation to let a undangend species.		
Aesthetics Solids and Floatables	15% national lisature at the whole SM signific	\$0.75% or the ear no SE remove	25 50% or now with no 58 terminal	15 JSN 3 for ker of (4)	SAF arrest sever of sestion of control sever of CAF arrests	Server Marie	C 15% or becominged for yourse with positive \$4,5° recovery surrects.	100 (35% of processed free realed with preside SAT lember lighterns.	25 SON of backarged from Visable with policies SAS (introduce or residual)	SL 165 3 prominged for tracket will country 167 amount promine	75% of discharged flow tracked with position S&F rootsystil (acrossis)	0-	
Aesthetics Odor and Air Emissions	Chase indowns only balace attempt - 20 nutbrain ones		Congressive recovery policy country additional 420 subserved occasionals	Cinemiannocably kan your laborary 50 outcomes after		No make an agent	Eliminate despitable pro- source ethiciting a sti consistent, accupionally	Similar selectable ser- yourselecting - 50 customery often	Eyrouge annewing satisfaction affecting with participation above the	Serimate among oder soon affecting 175 septimes other in 275 septimes grounded	koulds allesting +20		
Dissolved Divygen mpacts	Prouding at a system 90 for ing 1 - storing choice from behalf	Gentinusui reduction oi m sessen 50 of 2 mg² :	Continuos reductorius processes 30 ot 5. 2 mg/s positibe resultatorius in registering chicas carquisonius.	seem DC 2 mg/l - semicar during non-linear constant	organistani reducajni si in 1976an 50 S 3 mg/ spanosa Sung sin Local candisana	file OO supports	emental increases of a season SO 0 3 regst	marain 202 mg/ -	d Curtosbut, ingelesses seriem 30 - 1 mg/ in intermetal ingelesses ingrovements 34 mg/	Company resources on a	Colleged intervenient of ontal tortales in steam 50 7 mg/l	, a	
Downstream mpacts	Teles increase in whose BCC or harvirollands	50 75% remains it are us BDC to not rest turbs	75 - 10% nomest in arriva 800 o numeri sada	10 25% recesse in annual BOC of numeral loads (CSC) runoffs.	Powers II 10 % increase in emiss everage 600 or historial case (CSC) i unon	No impact on BOU or number loads (CSO inc	C 10% induction in annual BOD in runners leads 1000 - supplies	10-35% reduction to demail 800 or numbers roles (550 - funció	25 ION MARKED FAMILE BOD'S TOTAL GAS CSS Jungan	50 *5% reductor in across 800 to human sees 550 - locat	75% - reduction in annual 800 or numeral leads (CSO + numer)	A SECOND CONTRACTOR	
Stream Flow impacts (Peak hows)	25% in contage in place from	10% 25% skrikke i peak filter	up to 10% nomine is seen flows	Frequent ochabe to be Sunng concer conditions	Process victorial in average from to minut be rease in high flow bease	No impact on pasts flows	Minor reduction in flows in sugnificant page reduction	Minor educado in peax flowr phase some condigents.	Date (Chr. Haycher Jane Hawe)	10% 23% equitor - bear	25% - HOUCEST IN ONDE FOWE	W. 1995 - 1995 - M	
Stream Flow mpacts (DWF only)	25% decrease in the surrey crease randomic	10% 25% accesse in fice during trilical conditions	0-10% permanent becrease in flow its ing or fice iconditions	Fracuent servers of the oursig critical Conditions	Follow decrease investiga-	No impact on everage or trans shown flow	Intermittent ricroser in shear flow not break a crisis conditions	merodent include of shell flow other markets to sold constitutions.	T 10% assmance includes to their New Suring Indications on the Suring Indications of the Includes of the Inclu	o It 25 % personed consult in street few during or los conditions	25"- dermanen oblagge in stwen his during chical conditions	A AP . A CO	
	one each atternative for e native in this value (3.) Sh					npact of the alternation	re on the value (2.) Total	at the scores for each	aspect to get the total		7519.5	ev. Score Calculated	
Aspect	Rationale						Measurement N	lethod			1012	I Store Default	
restriction  Hestricts - Solids and Floritables	Most CSOs have some for	rm at saixes and floatable water reterrigin construct	is control balfiles improvi	commissistems may prove	IP DE expected with scree 4-solids and floatables re-	mova as well whole-	all sales with committee will be estimated for all advanced treatment lex	ables removal efficienci nhologi, improvement alternatives that add so nhokigies. Where trea	nas peen essmated for contemporal efficiencies reening of other				
esthetics Odor ad Air Emissions	Opens and an emissions of both the intensity and the o sewage handling facilities.					waltes of acors from	Didor emissions from se mensity quality and ge- level of evaluation a not gare organistances. The estimated based on you storage time, number or	ographic spread. For p common, and will not be potential for odor and call applications and mo	winning auroases this se done except in very air emissions will be del predictions fol				
ssolved Oxygen spacts	Orssolved divigen in litréam	is é depéndent on a vane	ery of history including BC	35 pac hybrens plac size	am flow reloces, water in	miperarure etc	For BGC the Water Gua various Gading condition of individual projects will various stream condition	s flows reimperatures be estimated based on	ett Propable mpacts				
ownstream spacts	Downstream modes refer to conditions in the Otio River below Letterson County Nutners loadings in the Otio more set Letterson Liquids in deathers to source of 30 - 45% of the rotal instruct loads reaching the Guif of Mexico - BOD is not lively to partises in the river long energing of the source of the set the source of the river long energing the Guif out that have determined to continue the Guif out the set of the set of the river of the river of the set o						Poliutant removals will be average loads since the and cumulative	e estimated based on re downstream impacts a	ouctions in annual contraint, long-ferm				
	Edirements high deak lews as are offen tallsed by intransarion of a watershed can engoy his breambed dannage eduand and temperial t make water based recreation inhalfs or intransacion.						Predictive models can es sources and the Water ( estimate stream hows du	Quality floor has a hydra	ыс сотролет то				
nam Flow pacts (DWF only)	Oversion of flows away from measures (uch at groundwi	r a stream our to abance afer our bing can ricreas	onitiert of a treatmert pa se base flows with behelik	art enc dan reduce base h va results	DAS 7-1 (Vey) - Atemp	ARY THE COLOUR	Predictive modes can es Water Quarty Fool has a sunnig various dry weaths	пудгаме потгранит го					
ronyms C. Beargrass Cree D. Bological oxyge		D	OC Dissoved brygen IWF Dry weather how egil Milligram per der	\$	Soles are formatie								

Exemples of the property of th

The same of the sa	Eco-Friendly	L OR MF 015 y Solutions											
Aspect	T5	.4	-3	-2		1 0	S	coring	1 3	1		Annuality	Page Back
Non-Renewable Energy Consumption	Primary energy consumption is greater than secondary treatment	Primary energy	Primary energy consumption equal to 30 75% of secondary treatment	Primary energy consumption equal to 15 30% of secondary treatment	Primary energy consumption equal to 0 - 15% of secondary treatment		Cleaning and maintenance not needed no primary consumption	1	NA.	NE.	QA.	Assumptions	Score Per Aspec
Use of Natural Systems	Constructed facilities permanently displace 5+ acres wedenes or 50% locally available green space	Constructed facilities permanently displace 3 5 acres wehands or 25 50% locally available green space	Constructed facilities permanently displace 1 - 3 acres wellands or 10 - 15% locally available green space	Constructed facilities permanently displace acre wetlands of up to 10% locally available green space.	Constructed facilities temporarily disrupt werands or green space.	Alternative does not use or affect hatura systems, wellands, or green space	Alternative doesn not use natural systems, but enhances green space of wetland	Natural systems play a Tim- trole in alternative function to flack welfand or 10% auchional green space created	or Natural systems are posignificant pain of arternative function 1: 3 acres of wittand created of 10: 25% additional green space	Alternative fully uses nature systems 3' Stacres of welland created or 25 50% additional green space.	al Alternative fesults in multi- use natural system development 5+ acres in writand or 50%, additional green space.	Sanc Paris Com	
Multiple-Use Facilties	permanently eliminate	Constructed facilities significantly impare recreations 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	Atternative has imited positive impact or recreation	Alternative significantly enhances recreational opportunities	Alternativé noreases recreationa opportuntes narea	Atternative results in multi- use facility	C = Separa S = 3 S	-
Source Control of subwatershed pollutant loads	Pollutant loadings are increased by 53%	Poliutant 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 dollutant loadings impacts are inconsistent but likely higher	End of pipe pollulant loading are unchanged	Poliulant bacings impacts are inconsistent but key lower	Source control reduces collidary loadings by 0 104	Source control reduces pollutary loadings by 10 30%	Source control leduces pollutant leadings by 30 50%	Source control reduces pollutant loadings by more than 50%.	At the contract to the	
Non-Obtrusive Construction Techniques	Permanent loss of green space or sensitive area disruption	Main thoroughfare closures sens tive area temporary disruptions	Widespread dust and noise, blasting, secondary street closures	Localized dust indise and local street plosures	Minor dust and noise Itallic lane posures	No construction impacts	NA.	NA.	NA	NZ	NA .	Senter de la la	- ja
Consistent Land Use	Intrusive or duisance facilities inconsistent with neighborhood or land use:	Facilities inconsistent with reignborhood or land use	Facility characteristics mitigated to reduce impact on neighborhood	Facilies have significant impact or development density or land use	Facility has minor impact on development density or land use	No impact on and use or no above ground facilities	Alternative intrigates existing compatibility problem	Alternative removes facility inconsistent with the griborhand	Alternative removes nuisance facility from neighborhood	Alternative enhances property values in neighborhood	Bigs Table 1 of the Hill		
mpermeable Surfaces	Slacres+ of impermeable surfaces added	3 if acres of impermeable surfaces are added.	1 3 acres of impermeable surfaces are appear	up to flacre 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	3 scres of impermisable surfaces removed.	3 - 5 acres of impermeable surfaces removed	N 1774 450 - Q 17 11	σ,	
EEDS Performance	NA	NA:	NA	tu A	ŅΔ	LEEDS not applicable or LEEDS score <10	LEEDS Score 16 25	LEEDS Centred	LEEDS Silver	LEE28 Set	LEEDS Platnam	Ser.	
					ositive or negative, dep natives that score in th			e value. (2.) Total the se	cores for each aspect		Total Raw Score (	Calculated	·e
Aspect	Rationale						Measurement M	ethod			Corrected Sc	core	-6
ion-Renewable inergy consumption		ould be expected to be low or or high energy consuming a		nergy Senchmarking energ	gy consumption against conver	ntional secondary treatment	Evaluation of primary energy consumed at the WCWTF or			Note: The total score maximum score of 25		re than 25. In the instances where	this might occur, a defa
		concrete and steel construction westends and green space		apoons constructed bloower	ios de gardens etc that righ	ease greer space of various		voes of green space créateo basis di the anemative - gre					
			s for politi water-based and rip biking pichicing, camping etc		canong kavaking Caffing wa 60 i panar recreation	drid amunicidate moras de		iges predicted in the aqualic of increased base flow or decrea in areas etc.					
ource Control of ubwatershed offutant loads	Controlling pollutars load end of sipe freatment led		avid modification product rep	acements of Storm water in	anagement SMPs that Labluté	pollulánts thereby avoiding		aading reductions as narchate rature values or pilot crogram					
	Probable constituction in	pacts on hattic moise and d	ust are at measures of the free	ndiness of an alternative	Construction impacts get pene		Subjective evaluation of problems from the construction envisioned for the	able construct or impacts base e atternative	ed on the typic of				
on-Obtrusive onstruction echniques	nusance conditions												
onstruction echniques	Artemative configuration (	ar be disquised as a lesid		eignocmood if a arger p	ey unfriends burb station can arbo of land is ayanable is bur	ing station can be hidden as	unounding properties. Depe	can be defined to avoid negati nong on the availability of an ges project definisht and bud	d Johnancements are				
onstruction echniques  possistent Land Assertions  permeable Assertions	Alternative configuration in the same pump station of from view by landscaping landscaping impermisable surfu	ar be disguised as a resid and a community garden of accommonate signal runoff y	ence that lits right in with the n righter green space added to a	reignborhood (if a larger of enhance the neighborhood and the total transport (ii) an	arce of land a available is but	np station can be higgen is	unounding properties. Depe	nding on the availability of an ges project definition and bud	d Johnancements are				

Benefit Dost Tiol ve DtE M-R3 xis

/alue:	Public Health												
	M	leasure				lm	pact			Rationale	Mea	asurement Meth	od
ance Measure	Beargrass Creek CSOs	Annual O	d CSO Average verliow Volume AAOV1	75 MG+ AAOV	35 - 74MG AAOV	20 - 44 MG AAOV	5 - 19 MG AAOV	>0 - 4.3 MG AAOV	No discharge	be established through a 3 step process (1)  Establish the discharge volume using the appropriate scale for either Beargrass Creek or the Dhio River (2) Determine fine discharge's being relocated.	Measurement metricos OSC discharge. Divino the plosest pownstreat potential quotic contact measurements and ac-	s will use the hydraulic mo on will be calculated using m USGS gauging station of will be calculated based dessibility raings from the	The average floor The reduction for stream read Beadrass Cre
Performance	CSOs in Ohio Briver	Annual Ov	d CSO Average vertiow Volume AAOV)	200 MG - AAOV	75 - 199 MG AAOV	30 - 74 MG AAOV	5 - 29 MG AAOV	>0 · 4.9 MG AAOV	No discharge	- cownstream to a exent of higher dilution. If so, move one column to the right for each 20% addition to the dilution, 31 if the discharge's 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 20 40% 3 columns for 40 50 % 4 columns for 50 80 and 40 5 columns for more than 30%.	Ecological Reach Cha 2007 by Redwing E Characterization Parame	aracterization Report dat cological Services. The intersification Worksheet for cessibility and also gives length	ed December 2 epon includes a rieach stream re
	Frequency per location	1	•	Most Severe Impact				Least Impact	Ne impact				
		•	1	5	4	3	2	1	ō	Assumptions	Base Case Score	Alternative Score	Total Scor
	>10 per year	Most	5	225	<u>\$</u> 2	48	43	2		Base Case Score Onio River (440 ) = 494 6 MG (6) events per year	25		25
	5-10 per year		4	27	**	78	3	2					g
ency	1-4 per year		2	44	12 15	8,	Ē	7		Afternative Score Onic River (AAO) = 32.76 NG (Alexents per year)		P12	-tż
Frequency	2-4 year recurrence interval		52		1	*	8	-					Ď
	⇒4 year recurrence (nterva)	Likely		1	-		ě						ŷ.
	Not possible	Not	o		- 8		è	- ±		Total Sco	re		13

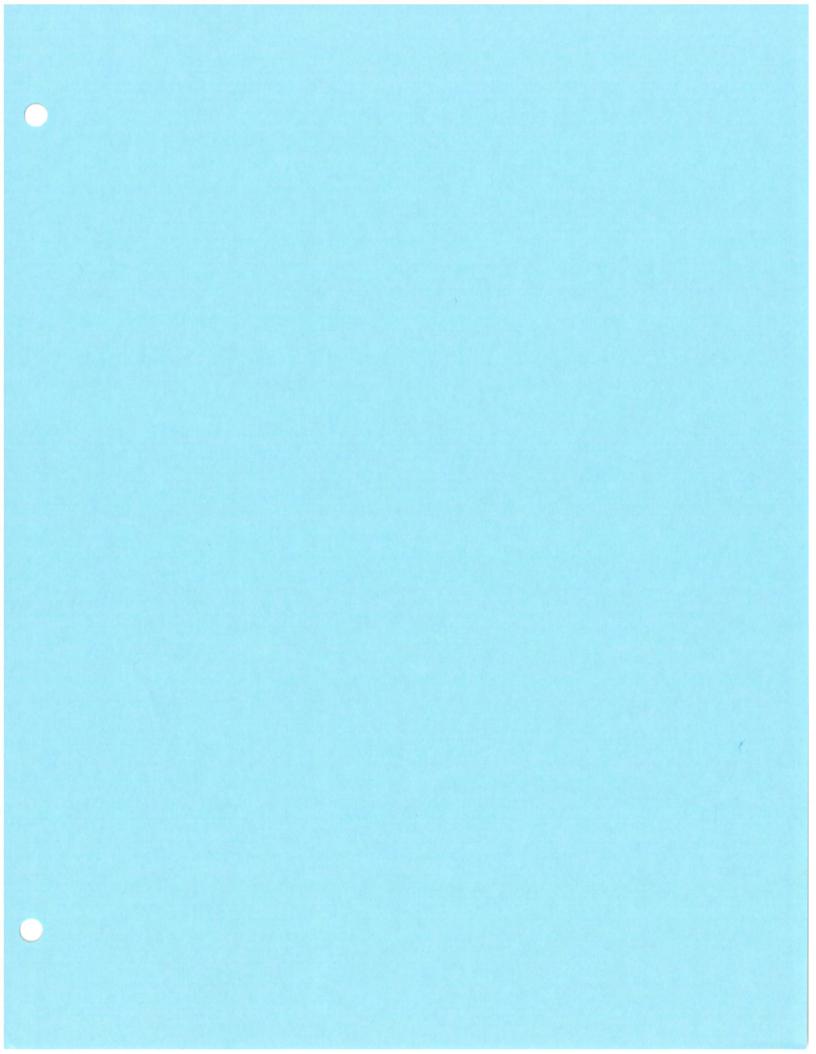
alue:	Regulatory Per	formand	ce									-	
	M	leasure				lmt	pact			Rationale	Meas	surement Metho	d
easure	Beargrass Creek CSOs	Untreated C Overflow	SO Average Annua Volume (AAOV)	75 MG- AAOV	45 - 74MG AAOV	20 - 44 MG AAOV	5 - 19 MG AAOV	>0 - 4 MG AAOV	No discharge	Environmental impacts or CSC discharges are directly related to the volume of untreated overflow discharged. Reduction in overflow volume is therefore the most direct way of measuring dositive impacts of CSO control. Since travel times are relatively sond during well-well-religious medical most fine and in the Ohio River through Lefferson County, there is no significant die-off of pathogens or in-stream treatment of conventional policitants.	CSO discharge volumes w	vill de determined <del>t</del> rom 'h	€ 7√3/3 <u>1</u> 400 7703
Performance Measure	CSOs in Ohio River		SO Average Annual Volume (AAOV)	200 MG- AAOV	75 - 199 MG AAOV	30 - 74 MG AAOV	5 - 29 MG AAOV	>0 · 4 MG AAOV	No discharge	Environmental impacts of collutains are therefore cumulative and not fied to any individual discharge ocation except the the upper most discharge in the watershed. Total overflow volumes will be used to represent environmental impacts, with a smaller range of flows for Beargrass Creek, given its smaller size, and the smaller size of the OSOs that discharge	of the OSS :	during the Typical Year 1	a,mraji
- <del>7</del>	Frequency per location		•	Most Severe Impact				Least	No Impact				
	requestion get recently	•		5	4.	3	2	3	Ç	Assumptions	Base Case Score	Alternative Score	Total Score
	⇒10 per year	Most	ő	25	20	Ē		Ē		Base Case Score Ond River 440, = 494.6 MG 61 events per year	25		25
	5-10 per year		4	25	- 4	- 5	à		101				0
ency	1-4 per year		3	* 1	12	12	1	15		Alternative Score Onlo River A40% s 32 76 MG - Elevents per veat		12	-12
Frequency	2-4 year recurrence interval		2	41	3	4.0		2.	î				0
	>4 year recurrence interval	Least	141	ŏ	;	3	:		-				0
	Not possible	Not Possible	٥	÷		3	9	-	200	Total Sco	re		13
cronyms	Not possible  eet paculates the total benefit arr FC Fiscal powderns se MC Million gavons	+ Mores			WIS Water quality				-	Total Soc	re		

- 600 000

alue:	Public Health												
	M	easure				lm	pact			Rationale	Mea	surement Metho	od
iance Measure	Beargrass Creek CSOs	discharge	CSO or runoff flow rate % of stream flow	75 MG+ AAOV	45 · 74MG AAOV	20 - 44 MG AAOV	5 - 19 MG AAOV	>0 - 4.9 MG AAOV	No discharge	Fubic health impact of discharges vary based on the lotal volume of the discharge, the dilution downstream from the discharge, and the actility of the discharge and the actility of the discharge of the impact score will be established through a 3 step process.  Fatebish the discharge of the opportunities appropriate scale for either Beargrass Creek or the Ohio River 2. Determine fithe discharge sideling relocated activities and the appropriate scale for eather Seargrass Creek or the Ohio River 2. Determine fithe discharge sideling relocated activities and the search of sideling relocated activities of sideling relocated activities.	Measurement methods GSC discharge Dilution the ploses; downstream obtential dublic pontac measurements and acc	will use the hydraulic mode will be talculated using in USGS gauge station to will be talculated based tessibility ratings from the	he average flo The reduction on stream real Beagrass Ore
Performance	CSOs in Onio River	Annual Ove	CSO Average rflow Volume AOV)	200 MG- AAOV	75 - 199 MG AAOV	30 - 74 MG AAOV	5 - 29 MG AAOV	>0 - 4.9 MG AAOV	No discharge	one column to the light 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 Mind leading.	Ecological Reach Chai 2007 by Redwing Ed Characterization Paramet	racterization Report date cological Services. The re-	d December 2 port ricudes a each stream re
	Frequency per location			Nos! Severe Impact				Least Impact	No impact				
		*	1	\$	4	3	2	9	3	Assumptions	Base Case Score	Alternative Score	Total Scor
	>10 per year	Most	5	10		15		1		Sase Case Score Onic River 4AOV = 32.4 MG 19 events per year	<b>03</b>		* #
	5-10 per year		4	22	18	42	₹/	-					ō
ency	1-J per year		3	14	E	ğ		3.		Alternative Scora   Onic Privar   AAOV = 1 32 MG   4 avents per year		3.	-3
Frequency	2-4 year recurrence interval		2			=		į.					8
	>4 year recurrence interval	Likely	-,	9.	-	-	- 1						ġ.
	Not possible	Not Possible	0							Total Sco	if¢.		12

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						Imp	act			Rationale	Mea	surement Metho	bo
	M	easure				my	act			Hattoriale		Surcinion men	
Measure	Beargrass Creek CSOs	discharge	CSO or runoff flow rate % of stream flow	75 MG- AAOV	45 - 74MG AAOV	20 - 44 MG AAOV	5 - 19 MG AAOV	>0 - 4.9 MG AAOV	No discharge	Enuranmental impacts of CSC disprarges are precity helated to the volume of untreated overflow disprarged Reduction in overflow volume is a therefore the most direct way of measuring positive impacts of CSC control. Since travel times are relatively short during wer weather in doth the BGC watersheds and in the Dhic River through celefers on County, there is no significant die-off of dathogens or in-stream treatment of conventional pollutants.	CSO sistratje vnu mes	will be setermined from "	he hydraulic
Performance M	CSOs in Ohio River	Annual Ove	CSO Average erflow Volume AOV)	200 MG+ AAOV	75 - 199 MG AAOV	30 - 74 MG AAOV	5 29 MG AAOV	>0 - 4.9 MG AAOV	No discharge	Environmental impacts of pollutants are therefore completive, and not need to any individual discharge coalion, except the me upper most discharge in the watersned. Total overflow rotumes will be used to	of the Cas	buting the hysical year	raintall
	Frequency per location	1	•	Most Severe Impact				Least	No Impact				
		•		5	4	3	2	t.	C	Assumptions	Base Case Score	Alternative Score	Total Sc
	>10 per year	Most	Ġ	25	20	15 - 2 	12	A.		Base Case Score: Ohio River: AAOV = 32.4 MG, 19 events per year	15		15
	5-10 per year		1	21	16	42	2		ž				0
ency	1-4 per year		3	18	- 24	ý	É	3		Akemative Score   Onlo River   AADV = 192 MG,   4 events per year		3	-3
Frequency	2-4 year recurrence interval		2	: †	ğ	÷		Ē					0
	>4 year recurrence interval	Least	t	A Pro-	Total	13	ž.						0
	Not possible	Not Possible	Ċ	į.	5	13		F	•	Total Sec	ore		12



DRAFT	Middle Fork Ne	twork Bran	nch 6 / Floy	ds Fork	Network	Branch 1 -	SSO Cha	racteristi	cs					
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





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 Ration (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	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	ASIDURON 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			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	9.43	12.06
					LF of 10" pipes or another underground solution with equivalent capacity		
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





Watershed/Geo- graphic Region		Project or Cost Sheet Name	Documented and Suspected SSOs Addressed	Solution Technology	Project Description	Weighted Benefit/ Cost Ratio (Capital Costs)	Weighted Benefit/Cost Rati (Total Present Worth Costs
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	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		0.85
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 t		ed at the 5-year design level.
Middle Fork	MF04	S_MI_MF_NB04_09B_C	21628-W, 46891, 91629, 91630	Storage			d 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

Conveyance

Storage

Conveyance

Upsize PS, increase size of FM, upsize downstream collector

Middle Fork

Mill Creek

Mill Creek

MF06

81814-W

81814-W

S MI MF NB06 M 03 C

S\_MC\_ALL\_Storage and Conveyance SOLN

S\_MC\_ALL\_Storage and Conveyance SOLN

00746, MSD0057, 01106

81814-W, MSD0047-PS, MSD0050-

81814-W, MSD0047-PS, MSD0050-

6.11

51.97

23.78

5.34

41.58

19.03





CURRENT	PREFERRED	SOLUTION

Watershed/Geo- graphic Region	Main SSO	Project or Cost Sheet Name	Documented and Suspected SSOs Addressed	Solution Technology	Project Description	Weighted Benefit/ Cost Ratio (Capital Costs)	Weighted Benefit/Cost Rati (Total Present Worth Costs
ORFM	NB01	S_OR_MF_NB01_01_C	MSD0023-PS, MSD0007-PS, MSD0010-PS, 26752, 41416, 24472	Diversion & Conveyance	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
		(U.S. Marian Control of Control o					
Berrytown Berrytown		S_FF_BT_NB01_S_09A_C_B S_FF_BT_NB01_S_09A_C_A	MSD0199-LS MSD0199-LS	Storage Storage & Conveyance	Off-line underground storage basin prior to Lucas Lane LS Install 180 LF of 36" pipes that branch off the gravity main prior to the Lucas Lane	101.60 85.34	106.29 107.09
		S_FF_BT_NB01_S_03_C_A	MSD0199-LS	Conveyance	PS, increase the size of said gravity main Upgrade pumps at PS to have a fixed discharge of 76 GPM	77.46	71.41
Berrytown Hunting Creek North		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		S_HC_HN_NB01_S_03_C_B	43750	Conveyance	Increase FM size leaving Riding Ridge PS	24.95	24.12
Hunting Creek North		S_HC_HN_NB02_S_09A_C_B	43411	Storage	install 185 LF of 48" in-line storage pipe	72.20	92.26
		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			43411		Upgrade pumps, wet well, and FM at the Gunpowder PS	8.87	9.09
Hunting Creek North		S_HC_HN_NB02_S_03_C_A		Conveyance	Install an off-line storage basin prior to Fairway View PS		54.96
Hunting Creek South Hunting Creek South		S_HC_HS_NB01_S_09A_C_B S_HC_HS_NB01_S_09A_C_A	43512 43512	Storage 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	47.40 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		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





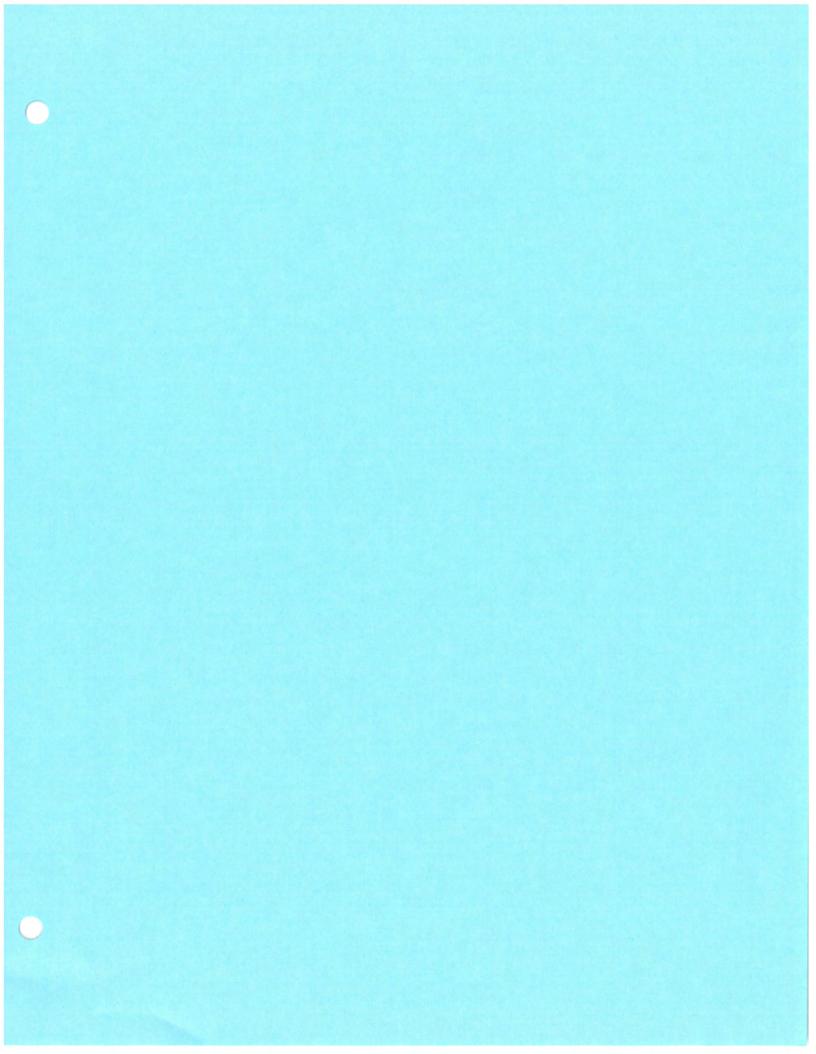
Watershed/Geo- graphic Region	Main SSO or Branch ID	Project or Cost Sheet Name	Documented and Suspected SSOs Addressed	Solution Technology	Project Description	Weighted Benefit/ Cost Ratio (Capital Costs)	Weighted Benefit/Cost Ratio
Lake Forest	NB01	S_FF_LF_NB01_S_09A_C_D	43614	Storage	Install 65 LF of 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	12.31	13.28
Pond Creek	200	S_PO_WC_PC07_M_0309B_C	21229-W		well, some downstream improvement required to eliminate surcharging  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





	CURRENT PRE	FERRED SOLUTION					
Watershed/Geo-	Main SSO	Project or	Documented and	Solution	Project	Weighted Benefit/	Weighted Benefit/Cost Rat
graphic Region	or Branch ID	Cost Sheet Name	Suspected SSOs Addressed	Technology	Description	Cost Ratio (Capital Costs)	(Total Present Worth Cost:
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

<sup>\*\*</sup>SSOs eliminated by projects considered part of the baseline conditions are not included in this spreadsheet.





#### SSO SSDP Modeled Solutions Project Fact Sheet



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



### 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

Printed Date: 6/18/2008 Estimate Date: 5/16/2008

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

Cost Estimate Description		Totals
Estimated Open Cut Sewer Construction Cost	69	1,166,000
Estimated Tunneling Construction Cost	69	
Estimated Off-line Storage Facilities Construction Cost	69	
Estimated I/I Removal Cost	S	
Estimated Pump Station Cost	69	
Estimated Flow Control Structure	69	
Estimated Earthen Basin Cost	S	
Estimated Force Main Cost	49	
Estimated High Rate Treatment Cost	S	4
Estimated Screening Cost	49	1
Misc. Extra Cost Description:	49	
Total Estimated Construction Cost =	S	1,166,000

Real Estate Costs Des	escription		1	Fotals
Easement Cost	# of Properties =	0	69	
Property Acquisition			60	
Misc. Extra Cost	Description:		69	
	Total Additi	Total Additional Costs =	S	

Multipliers Description		Multiplier
Administration Costs		4%
Contingencies		25%
Interest		%9
Miscellaneous		%6
Engineering & Inspection		8%
Design Services		2%
Program Management		4%
Planning & Preliminary Design		2%
Performance Bond		1%
	Total Multipliers =	64%
Data File Base ENRCCI 7312	PROJECT CAPITAL COST ESTIMATE = 3	1,912,000
Data File ENRCCI in use 7888	Project 20 Year Present Worth Estimate =	1,495,000
	,	

C = Cr(Qc/Qr)^m	Qr)^m		
Cr = cost from tool at maximum size for facility cost curve	st curve		
Oc = design size			
Or = 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.	all structure	95.	
EXAMPLE: For a BF facility of 500 MGD where 100 is the maximum size on lhe curve use:	00 is the m	aximur	n size on the curve use:
C = \$41,686,164 * (500/100) ^ 0.6	a	69	109,489,869
C500 from Tool	11	69	208,281,000
Difference (C - C500)	15	s	(98,791,131)

Benefit/Cost Model (	I Cost Date	60
Capital Cost	uș.	2,072,465
Total Present Worth	S	1,620,468

C) MSD

	1 "		11
or 8550	COST ESTIMATE	t Worth Estimate	onstruction Cost Estimate
overwrite by Estimate	PROJECT CAPITAL COST ESTIMATE	ct 20 Year Present Worth Estimate	Constructi
NRCCI ON	PR	Projec	

2,072,465 1,620,468 1,263,856

s s

## 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



# OPEN CUT SEWER CONSTRUCTION VALUE ENTRY SHEET

Project ID: S MI MF NB06 M 09 C

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

Estimate Date: 5/16/2008 Printed Date: 6/18/2008

Total Cost Per	-	207,10	498.775	314 333	
Total	,	0	49	41	6
InamingilA nadri	1				
raffic Maintenance Required	4	K	×	×	
Searing and Grubbing	1	×		L	
spields	4-			L	L
Asintenance of Flow	4	4	_	L	
Dewatering Required	-	<	×	×	-
jewet in Rock	╋	<	×	×	H
Small Medium or Large Creek Crossing (S.M. or L.)					
# of Existing MH I Surface Rehabs	C		0	0	
# of Diversion Structures	C		-	1	
# of Manholes	0		2	2	
Street Width (ft)	20	000	77	22	
# of Water Services Replaced	0	-	0	0	
# of New Inlets	0			0	
# of Aband'd Inlets	0	0		0	
# of San. Service Laterals	0	0		0	
Length of Pipe out Pipe in of Street (ft) (ft) Depth (ft)	20	13	2	13	
Length of Pipe out. Pipe in of Street Street (ft)	250	0		0	
Length of Pipe in Street (ft)	100	300	031	150	
"Pipe Size (in)	8	72			
Length of 'Pipe Pipe in Street (ft) Street (ft)	01106	00746-Storage	ACDOMET Chomon	Sound Storage	

800 = Total Length of Open Cut Job 800 = Total Length of Sanitary Sewer in Rock

Estimated Total Sewer Construction Cost = \$

864,369

Total Cost for Construction = \$
Small Job Multiplier =

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 Turneling worksheet

S_MI_MF_NB06_09_C							
	Divert 01106, Storage at N	Storage at MSD 0057 and 00746	00746				
				Raw	Raw Benefit Score <sup>2.4</sup>	core <sup>2.4</sup>	
	CSO/SSO ID <sup>5</sup>		Regulatory Performance	Regulatory Performance Public Health	Asset	Environmental Enhance	Eco-Friendly Solutions
	01106 00746 MSD0057		12 21	0 0 6	000	000	77
	0000		000	000	000	400	,00
	000		000	000	000	000	000
	Weighting Factor Weighted Benefit Score		360	130	54	8 48	-18
	Total Benefit Score Total Capital Cost <sup>3</sup> Total Present Worth Costs <sup>3</sup>	\$2,032,000 \$1,589,000					
Weighted Benefit/Cost Ratio (Capital Costs) Weighted Benefit/Cost Ratio (Total Present Worth Costs)	Weighted Benefit/Cost Ratio (Capital Costs) nefit/Cost Ratio (Total Present Worth Costs)	28.25					

- 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	ork B	Sranch	9# ۱					
Value	Value: Regulatory Performance - SS0s	ry Per	form	ance	- 880	S					
	Measure		-L	pact /	Impact / Frequency	nency		Rationale	Meas	Measurement Method	pot
Performanc e Measure	soss	6 month 1 Year 2 Year	1 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.	models to
cÀ	Value	25	16	6	4	-	0		Base	Prop	
uəı	01106		BL		PR				16	4	12
nbə	00746	BL			PR				25	4	21
님	MSD0057-LS		BL		PR				16	4	12
lote - This	Note - This value sheet calculates the total benefit.	ates the tot	al benefit.								
ACCONYMS AACV - AVI CSO - Corr	Acronyms AAOV - Average annual overflow volume CSO - Combined sewer overflow	low volume		WOS - W	Vater qualit	WQS - Water quality standards WWTPs - Wastewater treatment plants	t plants	BL - Baseline PR - Proposed	Sub	Subtotal	45

Value: Pu		20000								
	ublic Hea	Public Health Enhancement -	cement -	SSOs						
	Measure			Release Impact	Impact			Rationale	Measurement Method	Method
Performance Measures	SS SS	Basement Area > 50,000 Flooding Gals or Park or Blue Line Stream > Line < 50,000 50,000 Gals or	Residential Area > 50,000 Gals or Park or Blue Cline <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.	e via hydraulic mode e and the GIS to m designated
٨c	6 Month	25	20	15	10	5	0		0	c
oue	1 Year	20	16	12	8	4	0	1,000 GL BL	-	0 0
nb	2 Year	15	12	6	9	3	0	2,000 GL BL		
:re	5 Year	10	80	9	4	2	0	5,000 GL BL		0
4	10 Year	CO.	4	3	2	-	0	8,000 GL BL	0	0
Note - This value sheef calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 25.	calculates the ave	erage benefit over	r the recurrence in	ntervals. A corre	oction calculation	is included in o	rder to obtain a	Average Total Score	core	0
Acronyms CSO - Combined sewer overflow FC - Fecal collform GIS - Geographic information system	overflow ation system	BL · Baseline GL · Gallons						Corrected Score	ore	0

00746 - 2 YR	YR	<b>Network Branch</b>	Branch #6	9						
Value:	Public Health Enhancement	alth Enhar	1	SSOs						
	Measure			Release Impact	Impact			Rationale	Measure	Measurement Method
Performance Measures	\$ OSS	Basement Flooding or Park or Blue- Line Stream > 50,000 Gals or	Basement Area > 50,000 Flooding Gals or Park or Blue Cor Line Stream > Line <50,000 50,000 Gals or or 0 cor >2200,000 Gals Gals	Release 50,000 - 99,999 Gals	Release 20,000-49,999 Gals	Release 10,000 - 19,999 Gals	No discharge	Not all discharge Discharges vary and the environn developed guida based on the ris environment uno	Measure to quant establish locations	will be via hydraulic n charge and the GIS to ice from designated
Λo	6 Month	25	20	15	10	2	0	10,000 Gal BL	2	0
oue	1 Year	20	16	12	8	4	0	30,000 Gal BL	80	-
nb	2 Year	15	12	6	9	9	0	60,000 Gal BL	12	0 12
ire.	5 Year	10	8	9	4	2	0	100,000 GL BL	80	4
4	10 Year	5	4	3	2	-	0	150,000 GL BL	4	4 0
Note - This value shee maximum score of 25.	Note - This value sheet calculates the average benefit over the recurrence maximum score of 25.	verage benefit ove	r the recurrence in	ntervals. A corre	intervals. A correction calculation is included in order to obtain a	is included in o	rder to obtain a	Average Total Score	core	60
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information sys	Acronyms CSO - Combined sewer overflow CSO - Combined sewer overflow GIS - Geographic information system	BL - Baseline GL - Gallons						Corrected Score	ore	10

Value:	Public Health Enhancement -	ilth Enhar	- tuement	SSOs							
	Measure			Release	Release Impact			Rationale	Measu	Measurement Method	Aethod
Performance Measures	S S S	Basement Flooding or Park or Blue- Line Stream > 50,000 Gals or >200,000 Gals	Basement Area > 50,000 Flooding or Or Blue Line Stream > Line <50,000 50,000 Gals or	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.	thods will be violated by the discharge are sistemate from its.	a hydraulic mode nd the GIS to designated
٨٥	6 Month	25	20	15	10	2	0		0	0	0
oue	1 Year	30	16	12	80	4	0	6,000 GL - BL	0	0	0
nb	2 Year	15	12	6	9	3	0	25,000 GL - BL	9	0	9
91	5 Year	10	8	9	4	2	0	60,000 GL - BL	80	9	2
4	10 Year	2	4	9	2	-	0	100,000 GL - BL	4	4	0
Note - This value shee	Note - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum access of 55.	verage benefit ove	er the recurrence	intervals. A corn	ection calculation	is included in o	rder to obtain a	Average Total Score	Score		2
Acronyms CSO - Combined s FC - Fecal coliforn GIS - Geographic	Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system	BL · Baseline GL · Gallons						Corrected Score	ore		69

Value:	/alue: Asset Protection	ction											
	M	Measure				E	Impact			Rationale	Mez	Measurement Method	P
		Flood	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 soceas not affected and no damage expected	No standing water	Stormwater BMPs, can reduce a tormwater press, and reduce a shart of fooded areas, business and reduce a shart of fooded areas, business summeter past flows and increase the fooding inspect of shorms, Alemansway, purchase of highly imposted properties may be a cheaper way to reduce the odd sharts and create green space and buffer zones.		Distrace modes where available, historic customer complains from MSD Customer information System, or historic observations of frost prore areas combined with the expected relative impacts of seven system modifications on storm water flows.	complaints fro ervations of floo spacts of anwer
ce Measures		Basemen	Basement Back-ups	Scwor surcharging within 6 feet of found 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 hydroxly 1 - 2 feet above ground suffice, and basement floors are hydroxlay 8 - 10 feet below the first floor. A sewer surfuration of feet below the organization of surfure or surfue to the surfue or sur	*	Messurument mathods will be via hydraulic modes to quantity the markels, grade inns compared to ground surface elevations at markels.	to quantify the evalions at
nsmot	Storm Events	/-	1	Most Severe Impact				Least Impact	No Impact				
Per		•	/	10	•	m	2	-	0	Assumptions	0		
	6 Month	Most	N)	25	30	15	9	iD.	0		0)	Auernative acore	5 5
	1 Year		7	20	91	12	8	-	0		89	ч	4
neuch	2 Year		m	15	12	O)	ø	6	0		9	œ	0
Freq	5 Year		8	101	80	iD.		Ci.	0		4	in the	a
	10 Year	Likely	-	\$	7	6	N	-	0		60	ri .	-
	Not Possible	Not possi sid	0	0	0	0	0	0	0	Av	Average		N
Vote - This value sheet calculates t Acronyms	Viole - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in probe to obtain a maximum score of 35 Acronyms	igs benefit over t	the recurrent	re intervals. A correct	tion calculation is inci-	uded in order to obt	ain a miximum scor	m of 25.		1			

Owso

S Mt MF NB06 08 C | Value: Environmental Enhancement

Asses		7	19)		-		1					distribute	Court for Bears
Aquatic and Terestral Habital Protection	Elewator structures to sente	Browner of Agencies arranged to confere federal	Committee of men persons of commercialities	Special delication	form handeduring sons	Annual Section	More programmed al	Squitter principmen praying before	Crass of they are an order or control or con	Carry () sprice and a	Coats of oncatagous to next entrustrial about		
Anithetics Solids and Floatsties	The relation is maken it for with to \$40° supply)	No. 75th of the secondary	27 John of the art of the between the	Country of the spin and physics of the spin and the spin	Reducts entirms at reserva- field mentioners in the pringer set to fall services	medium pp is shared to	A set of deliberations framed and spotted Set's groups of spotted Set's	A. N. of pricespe has been on policy GAT proof (street)	A. 10. o Dortogel sp. benne wit profes 344 without A. sens.	22.4	JV) Profess are Directal SV Profess are Directal		-
Amsterice - Odor and Air Emissions	ciste anteng side secto	Create greens die Gostf William G. Starmen der a. Starmen	Chair Broupe, est danne Arbory A.C. Lumber: Matterials.	Creat describe two zinco.	the part of restalling	N 100 ( ) ( ) ( ) ( ) ( )	Formore phile table repr Spuils Projekt 134 continues on account	Descript intercals also Bactor all schry - kil conserver of the	Common arraping office transfer of the common arraping of the common	Emmer emery our sours distributes of symmetry from it -47 Symmetry addition of	Ala Transport 2º Saylay etroj co Notone smartj		
Oktobert Organi impacts	Pauchor or system (O) to 2 mg + dung prices film general.	Common Michael & Common	Caronacia macray su entre DC 40 1 Froji tembre reacher to si metric DC 1 may dump	The state of the s	Personal Control of a second control of a seco	he included in	described to person of	Spirit C. O Nichardahar Spirit C. O Nichardahar Spirit C. O Spirit Canada Spirit C. O Spirit Canada Spirit C. O Spirit Canada	Consude egovinese il in giusso (Co 1 mg/ public (Co 1 mg/ chemistri initia conduc- ciparementi 2 i ingli	familiar to a model of the	Crecions instruments in photos spekies in this en focil my i		
Countriesen impacts	No Petialis in physic 600 or hower bach	10 (A), notes in a send NOT in surpreting	A - Mr. notable a small	the Personal service of agency (OCO a name taken (CO))	Popular ( - 10 L. ochsiste in actual periodic (CCC - scent)	My macra are gold as natural bare (100 c.	6 - Provedición in ensus 400 processes ques (CSO Candillo	10 Zhi eskourin amur biligia nyram sami cikin shooti	21 Mrs. retainer a tenuel M22 is full and taken (242). nooth	201 - 71 - Helderice is princip 2000 il radioni hash COSO - nostri.	This remains in service BOTh in whole said (CO) in these		-
Stream Flow Impacts (Peak flows)	And the state of the state of	Action Processor & State	(by the telescope plan	region resists of the	Assis come a may fee a not come a Ag the past	Printer in term band	And the state of t		Gill This regulation goal	(S). It is take to a pass they	21 - shifter is per time.	the second section is a second section of	
Simblim Flow Impacta (DWF only)	21 parent who area	CS. At answer y As Ared order predicts	E 17- personnel december of the space of the garden strikes	Angel decision in the	Water of establishments	To report by John St.	promotion prints in given for any loss of mind coefficient	chambles seems of at up tax view methol chief coefficie	C Tre-parameter separate state the bring cond conditions	Albert Starte on Articles Albert Starte on Articles	23 - personne contas e tribe to skrag trica carthan		
nativetions (1) Sucore to this after	instruction (1) Score and advisable for and of the recent special of the roles. Scene can be provide at magnin, depending on the inspect of the advisoring on the value (1) feeling the account the second to advisor the score in this area should not be proposed.	each of the seven aspect haded area represents "	ts of the value. Scores. fatal flan." Alternatives	can be positive or negal. That score in this area a	tive, depending on the it hould not be proposed.	egact of the alternative	e on the value (2.) Tot	tal the scores for each	aspect to get the total		1	Carlo Branch Charles	
Aspect	Rationale						Measurement Method	Aethod			Tim	Total Saver Contacts	1.
Aquestic and Terestral Habital Protection		de sieder propakt top, die Lien ap de sot teastes kelden herby Ankryon kinsa her post hoer were aufde). Na Franchischer V. Franch in versche sot in wentere som er setze for de suck man er soon all sith to prodict Verspon regions en is servojate inderes mat be sand to service laber position and regions regions.	Terrestres tradeur fermaly or analysis eye weather or used to mierale fullers of	charges whose how per veryd missame have a an scallus and regative repa	ush toper water quality, the state shelle, to product books cits.	i ins core: chains shape bological decistr changes.	Propert deletion may a and configuration thee and configuration thee pand for rather to alke to alke authors to alke authors and	Specifically abdiness chas Confective in y arquitis. Fine mostels, in estimates of changes in	Proper deviation may specifically address changes in their specifical and correlations their closel etc. Propose enough end address CO and changes are applied to the action and applied their action to agree their specific specific specific and action to the action and action to action to action and action to action and action action to action and action action and action action and action ac	Note: The local calculated	SCOPY CANCLEANO WAY BE PROFE BY	MOJE VAN 25. IN DIE VNEEKES WINNE VEG ROOM COCCU. a GARALI MAAIMAN	alman acces of 25 will be
Asstrance - Solds and Fostables		And CCI, the activation of solds and desides consciously before the constant is reported that the major of the solds and the sol	es control haffes, limpes es control haffes, legis es efficiency is not likely.	enterth is capture cates o and other control systems possibly points will be ann	an the requirations with school may provide apidits and its mand if the in possible wit		Current solids and float off july with control lec all he estimated for all advanced treatment let promised data	Convertishing variabilities immost immostory to their immostory to all delicity of managers and a finishing to a finish of the convertishing to a finish or their convertishing the convertishin	As boer amended to a in record afficiencies receiving to ofte mark is proposed for elect for well on published				
Aesthelics - Obur and Air Emissions	Coon and as ambients by both the riensky and from semage handley far	Den set an entacon an in process o stripp sythem, beny stouch for cabon are to the linear cases. Then are precedy the same by the few many of the sets	sieclebie and strooping a	in two makes and lange in two coverned descriptor	Waven Obnary		Cos emissors form a return galler, and a love of evaluation is re- one currence or a submanial based on the decage fine mander of	On amount from warps having larger, and its modeled by the control of the control	to car by modeled for planning purposes the be done record in very an extraction set po obligations for selection of:				
Discount Corper Impacts	Literatived benger in stress	aires es depundant en a vin	meets of factors reclading B	of factors recording BCD hast nativest exact sh	share her utters, salter	in perturbit	For BGC the Water Q videous bistoning covellar, of testinds at projects an various pleasest corebin	builty. Tool will be used to con from temperatures of the estimates taked on the scenarios.	You BOC In a Water Quality Tool will be used to startings the expects of imports of emboding conductional forms for experience as in Protection Imports of the extraction behavior to the extraction of the extraction behavior to the extraction of t				
Downstram Impacts	Overselvant repairs on oberfred as the source of the fast, but can have de	Somewase requity their is continue the Dos Roal below, pinknoon (Loan), sistem kunnyn in in Oo, red yn jaranni Comh, land ben poerfedig in te soors of Dos Acts of the soot halfen haden alland per Cod of the Mood. BOOT is to be by a present the new Loan propriety to pile. In this but can have derevered enjoch to be been been been been been been been	D. Rose testas jetiferació rent leada machine pre-ci necher	County Nethern buildings in	n the Chip (not just Jethen) I likely to permet in the river	son Courty) have boen in lang encugh to get to	Debutarit removals will average kada, since the and cumulation	*** **********************************	Inductions in annual any presents force from	2			
Stream Flow impacts (Feak flows)	A street by byte past if	demands legispata flores sa are often casumid b sake mitter bases) ne rejeks; ustalte is enpertissa	by urbanization of a water	Ward use ecode file springer	the state operate and	at terrestruct habitati	Predictive models can sowners, and the Wale attenuate sensant floads	Prédicties models can estimate fine posizing lactics from enfoncties sons est and the Water Quality Too'has a methale component to estimate sensan fond during which a plane memb	activis from exchantian raule: component to ords.				
Stream Plow Impacts (O'n)* ent/	3.0	vivion of Ness sees from 4 alexan San's, allandovenen d'a extenonal plant sei. Les missens salt an grandwijse pampen pam Ferniak base filesa ent benefoliermale.	chowners of a beamberly,	plant as: Can verbure blass accententals	Rear in playare	Ablimuturaly, pitter commis	Frederive models can Wider Quality Took has during softons dry west	Procedure modelle can externate stores from enhantal sculices, and the Video Quality Toy has a hydrastic component to sustmatis general teaching software day wealther events.	What sources and the to surmain protein force				
Acronyma NAC - Beargnate Creek	100		DO - Desonal orger		SLI - Solds and fuantiling	-							

Angeoral	and day was a	D A No energy consumption ercust for diseasing and	Scoring	bu Bu				Assumptions	
Fartweakbe privage proof to the	Present group 2. Present group controlled or	No energy densumption errough for diseasing and						Assumptions	
The property recording to the property of the	concludery and a section of the sect	ercopt for dealing and	Channy and married over		3	7			Score Per Aspect
Of Natural Contraction (1995)  Contraction (19	on concession of contractors believe whether which are a second of contractors believe and a second of contractors believe and of the second o	martemace	no needed, no primary N	47	743	MA	NA	Committee and part (Cont.)	÷
Controvad desires Communad lessines Communad lessines Communad lessines Communad lessines Communad lessines Communad lessines Communador (2007-2014)  Controvad Communador (2007-2014)  Controvador		Mainhaine does not use or effect natural pystoms, verlands, or green space	Abstrates doesn not use natural asperatus doesn not use of serbardes green space or a wedged	Natural syclents play a minor in role in affernation function: applied to 1 octs metand or 10%. In additional green space in created.	Natural Systems and Systems and the summand further, 1 - 2 acres of whater distance of 11 - 25% additional grown space.	Alternative fully uses resulted by Malerna, 3 - 5 acres of welfand created or 25-50%, daddisonal groom space.	Alternative legists in multi- use maintal system thereforests. 5- acres of entlend as 50%, widelooks pretain stools, widelooks		0
or Control Publicationary are protection to control and the co		No impacts on recoversorial opportunities	Attentation improvant. As access to assisting po-	Albertective has sented political impact on receivation	Alternative significantly enhances recreational	Attantate increases recreational opportunity as			0
Obtrushor present total organic hash historycental countries are smoothy transfer as a historycental countries are smoothy transfer as a historycental countries are smoothy transfer and countries are smoothy tra	20	End of pipe policient leadings are incranged	2.5	Source control reduces poliulant residnes by 0 - 17%	Source correct reduces politikant controls by 10 - 30%.	Source compains to 30 sollutant busings by 30 50%.	-		0
istent Land imuser or mishon  Serviny councies reconstant with inhigherhood of task sixe misquid to reduce impati inhigherhood or task sixe or resphondood.		No construction implacts	NA NA		1	2	5		0
	are significant. Facility has minde impact on development: dovelopment blensity or land land use:	No impact to builties or no above greand facilities	Amenatory mogatas trashing compatibility in problem	Abamaton nemovas tacisty or reconsistent with neighborhood	Aberratve removes reserve facity from feetborhood	Alternative annunces property visition in	Attendative provides onhancerents that significantly ingrove		a
impermeable Sacret-ormograph 1-3 acret or impermeable 1-3 acret or impermeable Surfaces by officers are added professional solutions are added assistant and solven a	No surfaces are impermeable surfaces apped	No change in incermeable stufface	Minor reduction in . Up	intpermedia ed	9.0	3 - 5 dente, of Impermedition	Mee than 5 acres of impermeable surfaces		-0
LEEDS (4A NA NA NA	WA	LEEDS not applicable or LEEDS scott -10	1 82 - 01 802 SCORE	LEEDS Conflod		LEEDSCAM	(FEDS Pateurn		0
Instructions: (1.) Score such attentative for each of the eight aspects of the value. Scores can be positive or regalive, depending on the impact of the alternative on the value, (2.) Shaded area represents "Ital flaw". Alternatives that accer in this area should not be proposed.	an be positive or negative, depend Alternatives that score in this are	ling on the impact of the should not be proposed	afternative on the value	. (2.) Total the scores	for each aspect to		Total Raw Score Calculated	designated	7
Aspect Rationale			Measurement Method	pod			Total Score (Default)	anut)	7.
Monthersexpite Ecolemote solutions would be expected to be become consumered in concensuable entering. Send making entering consumption provides better points for any eviding consumerable.	Agents (Drvun	Block secondary byament	Extraction of permany energy contamined part MG of took tristled, consumed at the IMCNTTP part IMC tristled.	Assimed per MG of ficer treate NG treated.	d, notapared to the energy	Note: The total score calculated may be maximum score of 25 will be calculated.	calculated may be more will be calculated.	Note: The total score calculated may be nove than 25. In the instances where this might occur, a default maximum score of 25 will be calculated.	his might occur, a defaul
Use of Notheral Numeria systems related concerns and stee construction with test below storage lappores, (continue) Systems.  Operation that induce well-and about proofs space ppi upountry points.	J bosenies.	A state to branch for some or green species for the several seasons.	(AUT) TO SHEAT SHEAT OF THE THE SHEAT SHEAT SHEAT SHEAT OF BEATHER AND SHEAT S	that of green space created or	emmated Annicolous				
Multiple-Use (Increments solution constitute) speciments for their sales dated and square recovery. Busing, deliming, leading, latering, seating their sales of control of sales and sales of solutions and sales are control or sales and sales of sales and sales of sales and sales of sales and sales are control or sales are control or sales are control or sales and sales are control or sales are contr	Soaling, carong, karakny, Tahing, wading idened related sparks mirreation		Soferite e a dustro of charges freeled in the stock, or you are verscriven as a result of come waster quality, inclinated base free or dicensesed froe pulse, increased the core or regulated relating pass sig.	s presented in the aquabit, or reliabled bable flow or decreases with	paren enveronmen sa a d flow psake, increased				
Southor Carlo de Conding polition langue in the south integral features modification, product replacements or same politicant loads.	ormean management BMPs from capture prohesents thereby an ordering ford		Moored tard suits positions looking inductions as calculaters by the RIGE Wass Chesty. Too it by combanions to insensary splives for job program mobilishers for	ang reductions as calculatered to	y the BSC Water Creaty assurements.				
Non-Obtuding Problem (white prints in resists on tartic, note and that are all measures of the benchmark of in later Techniques	Aleman w. Construction impacts on Londay points for carding	Nation Co.	Subjective ovaluation of probability continuation unvarience for the alternacy is	mpairts ba	and our the type of construction				
Consistent Land. Alternative configurators for the strings of About from the washaming strong for stamps. An automotive strings of the stamps of the strings of the stamps of the strings of the stamps of the stamps of the supplied of the good tensor of the good tensor of the supplied of the good tensor	an indremity unitendry camp station can be nasy.	shicky, and copy. The be hidden from view by	At the Learning score, springer 6 can be defined to an oil regulnes regulate and the statement was summaning proporties. Describing on the multiple of short in threat-eners was position. This superil recovering smiller definition and buildings for energy not paying.	in the defined its secon negative fig for the instantisty of land.	embals on the enthaldements are to to rechance not detact				
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Accomms Accomms Mic Beaugass Creek LECD's - Leadership in Energy and Environmental Design WICKWTP - W	MG - million gations WCWTP - West Crime Washington Transmiss Disea								

O MSD



### SSO SSDP Modeled Solutions Project Fact Sheet



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



### **Project Cost Summary Sheet**

S MI MF NB06 M 03 C Project ID:

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"

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

Estimate Date: 5/16/2008 Printed Date: 6/18/2008

Cost Estimate Description		Totals
Estimated Open Cut Sewer Construction Cost	(A)	1,205,000
Estimated Tunneling Construction Cost	69	
Estimated Off-line Storage Facilities Construction Cost	69	
Estimated I/I Removal Cost	69	
Estimated Pump Station Cost	69	2,998,000
Estimated Flow Control Structure	69	
Estimated Earthen Basin Cost	S	
Estimated Force Main Cost	69	341,000
Estimated High Rate Treatment Cost	69	
Estimated Screening Cost	69	
Misc. Extra Cost Description:	69	
Total Estimated Construction Cost =	st = \$	4,544,000

Real Estate Costs Description	tion		1	Totals
Easement Cost	# of Properties =	0	69	
Property Acquisition			co	
Misc. Extra Cost Dea	Description:		w	
	Total Addit	Fotal Additional Costs =	65 II	

Multipliers Description		Multiplier
Administration Costs		4%
Contingencies		25%
Interest		%9
Miscellaneous		%6
Engineering & Inspection		8%
Design Services		2%
Program Management		4%
Planning & Preliminary Design		2%
Performance Bond		1%
	Total Multipliers =	64%
Data File Base ENRCCI 7312	2 PROJECT CAPITAL COST ESTIMATE = \$	7,452,000
Data File ENRCCI in use 7888	88 Project 20 Year Present Worth Estimate = S	7 303 000

C = Cr ( Qc / Qr ) ^ m	1/Qr) vm		
Cr = cost from tool at maximum size for facility cost curve	sost curve		
Oc = design size			
Or = maximum size for facility from cost curve			
= cost for design size Qc			
= correlation exponent (0 < m < 1) Use 0.6 for	r all structur	es.	
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 runse use.	r all structur	es.	adi no azis n
C = \$41,686,164 * (500 / 100 ) ^ 0.6	100 is the rr	\$ \$	109,489,869
C500 from Tool	п	69	208,281,000
Difference (C - C500)	11	S	(98,791,131)

Benefit/Cost Model Cost	Sost L	t Data
Capital Cost	69	9,060,753
Total Present Worth	49	7,915,904

€ MSD

ENRCCI overwrite by Estimator 8550

PROJECT CAPITAL COST ESTIMATE =
Project 20 Year Present Worth Estimate =
Construction Cost Estimate =

\$ 8,077,409 \$ 7,915,904 \$ 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



# OPEN CUT SEWER CONSTRUCTION VALUE ENTRY SHEET

Project ID: S. MI. MF. NB06\_M\_03\_C

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

Printed Date: 6/18/2008 Estimate Date: 5/16/2008

Total Cost Per Segment			. 69	49					. 8									S									
InsmrellA nedrU																						-		1	-		1
Traffic Maintenance Required	×																										
Clearing and Grubbing	L		L		L		L	Ц			L		L	L	L	L	_	L		L	1	L	1	1	1	1	1
Brownfields	H	-	H		L		L	Н	_		L		L		-	-	L	-	L	L	-	1	+	+	+	+	
Dewatering Required Maintenance of Flow	×	-	H		H	-	H	Н	-		H	H	H	-	-	$\vdash$	H	H	-	H	-	+	+	+	+	+	1
Sewer in Rock	×	-	H	-	H	-	H	H	-		H		-	-	H	+	+	+		+	+	+	+	+	+	+	1.
Small Medium or Large Creek Crossing (S,M, or L)																											
# of Existing MH Surface Rehabs	0								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
# of Diversion Structures	0								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
# of Manholes	9								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Street Width (ft)	22								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
# of Water Services Replaced	6								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
# of New Inlets	0								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
# of Aband'd Inlets	0							0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
# of San. Service Laterals	32							0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
"Average Depth (ft)	0							0		000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pip of S	0							0				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
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Segment ID	000		T	T	T		T				T		1		T	T		T	T	1		1				1	

= Total Length of Open Cut Job = Total Length of Sanitary Sewer in Rock 2,300

\* - Use standard pipe sizes with maximum pipe size of 144 inches \*\* - Mnimum depth is 5 feet. For depths that are greater than 25 feet use Tunneling worksheet

1,205,012

Estimated Total Sewer Construction Cost = \$



## **PUMP STATIONS VALUE ENTRY SHEET**

Project ID: S\_MI\_MF\_NB06\_M\_03\_C

Printed Date: 6/18/2008

Estimate Date: 5/16/2008

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

Total Cost Per Facility	42,038	1,460,997	1,495,191		
Ď.	69	49	69	69	69
Exclude Structure (-%)	%09-	%0	%0	%0	%0
Brownfields					
Dewatering Required		×	×		
Add Grit Pit					
Grinders Required	×		×		
Odor Control		×	×		
***In Rock		×	×		
Estimated Total *Estimated Peak Flow Rate Head (ft) (MGD)	0.02	0.5	0.5	0	0
Estimated Total Head (ft)	20	40	55	0	0
**Estimated	0	13	13	0	0
Facility ID	01106	MSD0057	00746	D	ш

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.



## 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

Total Cost Per Segment 73,200 35,825 232,313 Traffic Maintenance Required Clearing and Grubbing Dewatering Required ln Rock Medium or Large Creek Crossing (S,M, or L) Small # of Air Release Valves # of Manholes Street Width (ft) # of Utility crossings Average Depth (ft) Length of Pipe out of Street (ft) Length of L Pipe in P Street (ft) \$ Pipe Size Segment ID

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

2,300 = Total Length of Force Main

Estimated Total Force Main Construction Cost = \$

341,338

	0	Cluster Comparison	nparison				
S_MI_MIP_NBU6_03_C	Upgrade PS at 01106, 00746, and MSD 0057 and upsize force mains and d/s collector	746, and MSD	0057 and ups	ize force mair	ns and d/s c	ollector	
				Raw	Raw Benefit Score <sup>2,4</sup>	core <sup>2,4</sup>	
	CSO/SSO ID5		Regulatory Performance	Public Health	Asset	Environmental Enhance	Eco-Friendly Solutions
	01106 00746 MSD0057 000 000 000 000		12 12 0 0 0 0	00000	0000000	n n n 0 0 0 0	9990000
	Weighting Factor Weighted Benefit Score		360	10	9 0	8 48	-54
	Total Benefit Score Total Capital Cost <sup>3</sup> Total Present Worth Costs <sup>3</sup>	484 \$9,009,000 \$7,878,000					
Weighted Benefit/Cost Ratio (C	Weighted Benefit/Cost Ratio (Capital Costs)	5.37					
Notes:  1. Data Input Cells are highlighted in yellow 2. Raw Benefit Scores for Regulatory Perfor 3. Capital and Total Present Worth Costs fro	mance and	values are from the	e CSO or SSO I	Level of Control	Benefit Sheets		

<sup>4.</sup> 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	_		Netw	ork E	Network Branch #6	9# 1					
/alue:	Value: Regulatory Performance - SS0s	ry Per	form	ance	- 880	S					
	Measure		-	pact	Impact / Frequency	nency		Rationale	Measu	Measurement Method	pot
Performanc e Measure	SSOS	6 month 1 Year 2 Year 5 Year	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.	is will be via hydraulic harge.	models to
Á	Value	25	16	6	4	-	0		Base	Prop	
ouə	01106		BL		PR				16	4	12
nbə	00746	BL			PR				25	4	21
ᅺ	MSD0057-LS		BL		PR				16	4	12
ote - This	Note - This value sheet calculates the total benefit.	ates the to	tal benefit	يم ا							
Acronyms AAOV - Av CSO - Con	Acronyms AAOV - Average annual overflow volume CSO - Combined sewer overflow	ow volume		WOS - V	Vater qualit	WQS - Water quality standards WWTPs - Wastewater treatment plants	t plants	BL - Baseline PR - Proposed	Subtotal	total	45

01106 - 2 YR	YR	Network Branch #6	Branch #	9							
Value:	Public Health Enhancement	Ith Enhan		SSOs							
	Measure			Release	Release Impact			Rationale	Measu	Measurement Method	athod
Performance Measures	SOSS	Basement Flooding or Park or Blue- Line Stream > 50,000 Gals or	Basement Area > 50,000 Flooding or Or Blue- Park or Blue- C50,000 50,000 Gals Gals or	Release 50,000 - 99,999 Gals	Release 20,000-49,999 Gals	Release 10,000 - 19,999 Gals	No discharge	Not all discharge Discharges van and the erwiron developed guide based on the ris erwironment un	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.	nods will be via discharge and sistance from de	hydraulic mode i the GIS to
٨	6 Month	25	20	15	10	2	0.			C	
ou	1 Year	20	16	12	a	V		10000+		0	0
ər		47			0	*	0	1,000 GL BL	0	0	0
nba	z vear	91	2	6	9	9	0	2,000 GL BL	0	0	0
-1°	5 Year	10	8	9	4	2	0	5,000 GL BL	0	0	c
i	10 Year	2	4	3	2	+	0	8,000 GL BL	0	0	0
Note - This value shee maximum score of 25.	Vote - This value sheet calculates the average benefit over the recurrence maximum score of 25.	erage benefit over	r the recurrence i	intervals. A corn	intervals. A correction calculation is included in order to obtain a	Is included in o	rder to obtain a	Average Total Score	core		0
Acronyms CSO - Combined sewer overflow FC - Fecal conform GIS - Geographic information system	Sewer overflow	BL · Baseline GL · Gallons						Corrected Score	ore		0

00746 - 2 YR	YR	Network Branch	Branch #	9#							
Value:	Public Health Enhancement	alth Enhan		SSOs							
	Measure			Release	Release Impact			Rationale	Measur	Measurement Method	ethod
Performance Measures	® OS/S	Basement Flooding or Park or Blue- Line Stream > 50,000 Gals or	Basement Area > 50,000 Flooding or or or or Stream > Line Stream > Line < 50,000 50,000 Gals or	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.	ods will be via discharge and stance from de	hydraulic model ithe GIS to signated
Æ:	6 Month	25	20	15	10	5	0	10,000 Gal BL	5	0	2
oue	1 Year	20	16	12	8	4	0	30,000 Gal BL	80	0	80
ənk	2 Year	15	12	6	9	3	0	60,000 Gal BL	12	0	12
nec	5 Year	10	8	9	4	2	0	100,000 GL BL	8	4	4
3	10 Year	5	4	3	2	-	0	150,000 GL BL	4	4	0
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Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information sys	Acronyms CSO - Contined sewer overflow FC - Fecal coliform GIS - Geographic information system	BL · Baseline GL · Gallons						Corrected Score	ore		10

Mapagar	MISDOOS/-LS-2 TR	Network	Network branch #	0						
Value:	Public Health Enhancement -	alth Enhar	- rement	SSOs						
	Measure			Release	Release Impact			Rationale	Measurement Method	t Method
Performance Measures	SSOSS	Basement Flooding or Park or Blue- Line Stream > 50,000 Gals >200,000 Gals	Basement Area > 50,000 Flooding of or or Or Base Stream > Line < 50,000 50,000 Gais or	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 hydrautic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.	e via hydraul e and the Gl
٨٤	6 Month	25	20	15	10	2	0		0	
oue	1 Year	20	16	12	8	4	0	6.000 GL - BL		0 0
enb	2 Year	15	12	6	9	8	0	25,000 GL - BL		
Pe	5 Year	10	8	9	4	2	0	60,000 GL - BL		0 0
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Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information sys	Acronyms CSO - Combined sewer overflow FC - Fecal collornal GIS - Geographic information system	BL - Baseline GL - Gallons						Corrected Score	ore	1

Hones or Flood Damage businesses are producing limits flood guilding services to a screen to access to acc	pact					
Hondes or Hondes or Hustnesses are Prooding limits Received from Every Coccas to International Advantage Server (1997)  Server			Rationale	Mea	Measurement Method	_
Severing Sev	Standing water on property, but access not affected and no damage expected	Syomwater BM peaks and redu white severs say (Cotatods Storm Administratory, pu properties may frood distinges an frood distinges an	Stommater BMPs can reduce atominate white and another of rocket mass, while some sequention may bronze and while some sequention may bronze and receased stommate to allow and another some sequention may be another some sequence may be at dispaying may be at dispayed may create the preent space and building the product control of simple sequences may be at dispayed may be at dispayed may be at dispayed and create space and building context.	Drainage models where available, herboric of MSD Customer Information System, or this provide areas combined with the expected as system modifications on storm water flows.	Drainage modes where available, heldoric customer complaints from MSD Customer information. System, or historic observations of liocatorova areas combined with the especied a historic impacts of several system modifications on storm water flows.	complaints from varions of floor pacts of sawer
S 4 3 2 2 10 11 Year 1 Year 3 15 15 10 15 15 15 15 15 15 15 15 15 15 15 15 15	Sewer surcharging within 6 feet of ground surface for 0 - 1% of manholes	Frist hoor levels are typically 1 (Frist hoor levels are typically 1 within 6 feet of sever surface.)  Ground surface is highly likely to cause homes with besement services.	Trist floor levels are typically 1 - 2 feet above ground surface, and beanment froots are spicially 8 - 10 feet below the first floor. A sever surface is below ground safect to below ground radface is highly likely to cause the and-ups in homes with basement service.		Measurement methods will be via hydraulic models to quantily the hydraulic grade liters compared to ground surface elevations at manifoles.	o quantity the
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be		0		Ó	9	0
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tions - 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. According to the contraction of the c	ain a maximum score of 25.		Tota	Total Score		0

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Stream Flow Impacts (Peak Rewal)	Self to discuss or the plant	Us. disassement pay form	At to 17 constant in pass front	Service in the Piles	Passin ecrosis e errigi Nos e rente success a regulate pases	to remain to salas four.	Mery reductors from to appricant peak reductor	Many and the part for order governor designed	24 % ITS, milenor is ball	D. Dr. obelos y pas.	M.L. entainer ripes loss		ri
Stream Flow Impacts (DWF cody)	25.5. across a bio samp alty or too tembers	the 25 posses in his	I IV. postured decision in the direct communications	Petater to day i has serve present cardiori.	Parking the state of the state	er deservices and	Marine to recitor of the little factor of the littl	o management excisions in minima files, where emphores committees a	2. It's photometric restriction their the Arragonius surdient	C. D. pember recent to their the dark prima.	Control (chart) in the control (chart) in the chart		
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Aspect	Rationals						Measurement Method	ethod			-	ted Sare Solution	-
Aquatic and Terestrial Nations Protection		Pradiction agait, and Pradict and State and Against material many and a surgent material material material and the surgent material and the surgent and su	pores and habes the second of property of the second of th	of section project out (first 20) south on the section brought company to the first form to project of the project of the section of the sect	nds fice, wanted gaality free hitted attenty to preptice basis serty	) ічні слое (Льігія: élape bologicii боевіті слагфеі		quectral) address cha cover le: Predictive m models, i les models, controles el checque	Freque to frequent year back audious charges es charges out on the and configuration the cave or frequent motion as darbing DO. The frequent part of the motion of the angle	Nos The Idal score calcu calculated	tales nay be	more than 25. In the evidences where this major sector, a defend	if materium score of 25 will be
Aestredica - Solida and Floatables	Most CROs there spent learn of the advanced breakers in spikers. I will Virtie reduction in spikes	om of Builds and Foablib vin. Soom water releases oblic and Buildables remo	the control buffles, imprint on constructed enclarate and efficiency is not think	of their initiatives of entry and control of the co	AT THE PERCHASING WATER AND	4	Commit which and liquid all alles with control lect will be elemented for all abstract transment lect abstract and transment lect abstract and the allest and remained data.	unides recrossi efficients, discretives free add to freelages. Where their chreatages where their	"more vicile, and finalities or recould filteracy, has been estimated by a fail are the created processing interactions of the processing interaction of the contraction of the contract				
Ansthetica - Odor and Air Emissions	Opers and an emergence of the Second and Table Sec	Can be generated report the quality of the oder Ca filteen	Metake and aerovery	en en grande de central en entre de comparte de la comparte de la comparte de la comparte de la comparte de la La comparte de la comparte del la comparte de la comparte del la comparte de la comparte del la comparte de la comparte de la comparte de la comparte de la comparte del la compart	SE brees District at \$1	nd quallest of odors.	Our encount for peoply helding location in included by locating and an excellent of the exc	tempo harding to alteration to open to	s can be excelled for playway purposes the bit done becopt in view I as executed as less only predictors the velocities etc.				
Disselved Daygen impacts	Chapthed organis in Strains		petr of tacon including	ampliantisms spine (surple extraority) that planers and COM (notation) records a finish a to be included in	Roam Now velocity, waite-1	demperature ch.	for BGC for Ware Da versus kaping condition of individual projects will serpus refront condition	ally Tool will be used a vos. foos verpetature. If be estimated based or in supparting	for DUC for Witer Chally Total to sales is sential the imports of values serving controls, from temperature, at: Probate frough of Norwald project will be definited belond on companions to be service interest condition were visit.				
overstreen rpecfs	Downstrawn impacts refer to identified as the source of 30 the Gulf, but can have determ	at to conditions in the Dis 130 - 45% of the total no uncertal impacts far dow	in River below Jefferson frees blats, reaching the rethos	o corestion or the Chee Thee better Jahrens Coard, Nuteral sadings in the Chie (so, para Jahrens Coard) have been 50 - 450 or are not nuteral sada muching the Oad of Maca. BCD is not been to see the first and arround to give a season to come on the coard of the c	in the Otics (see just judges) is always to person in the river	nor Courty) have been or lang emough to get to	Populari removas will be seemated based on mountainer in annual annuals busing the basis since the downstrivan impacts are grenarly brayes and cumulative.	be spirmaned based on r	nductions in annual and primarily templem				
Stream Flow Impacts (Psax Rows)	Cerements high posts time feasier water historic recreation	me as are often caused I nion umedie or engracisca	by articulation of a wald	ab ser efter cisized by witorosilon of a walksyled citi encie the dinserted damage n sende or reproduced	ribed damage as and an	Apart and terretinal tubble.	Predictive models can astimate from potatery bottom their enforchair Source, and the Wieler Challe? Tookhou in hydrolist component to element yiesen flows sharp univers point events.	caterate flow posseng is Charlip Tool have a hydi Anny samous promit ever	actors from reformal risults component ty				
Immers Flow reports (DWF or	Cheston of Rees away in ority) chestores auch as ground	VORDO OTRAS SANJ FOUR SIROSA DE DISORDORINT O SINSTITUTO DA MENTA MEN EN DESENDANTE DIRECTOS CAN EXISTA DESENTANTA DE MENTA MENTA DE SANDENCE DIRECTOS CON EXISTA DE DESENTA O	indonment of a brushment and bear from with but	24	mission have flower on advance. Alterna	Abernationis other control	Predictore models can estimate times from celevical postició, asto time Video Cauthy Tod has a hybrak, component in estimate sment has frittig cathys dy resulter trayes.	dilatelate favora france endo a hydraulic contextrened for they are	MOSA! Sources and the bi-estimate sonem flows				
CC Bayass CC Bayass CO Bakegoat SO Continued	Acronima Billio Balagnass Cereix Billio Balagiosi on gen demand CAD - Conformal semant havaltan		DO - Dissolved coygen DAF - Dry vestine flow and Allicon on the	. 5	SLF: Suids and tronsition								

USW C

	Eco-rilendly solutions	Solduoris											
Aspect	-97	4	-3	-2	-1	0	Scoring	ning					
Non-Renewable Energy Consumption	Printery onlongs convenionon is greater man secondary treatment	Persuary sneegy consumption equal to 25 130% of secondary	Primary heavily consumption squal to 30- 75% of succendary	Primary source; consumption equal to 13- 30% of secondary	Prmility enjetgy consumption iqual to 0 - 15% of connection incommon	No whence cor except for clea	Cleaning and maintenance not resealed no primary	N N	NA S	5	15	Assumptions	Score Per Aspect
-	Constructed technises permanently dispates 5- acres welfants or 50-a tocally as whate preen \$500°6	Conditional Springer Conditional Springer Demanding displaces 3 - 5 acres weldening as 25 - 5 acres weldening green Sprice	controver controvered lacines enhanced capture 1-3 cores wellship or 10 - 15-1 pice	Constructed facilities Constructed facilities (promished of up in 1917-1918) (01-10-1019) (01-10-1019) (01-10-1019) (01-10-1019)	Constructed lacenses emporantly filantipl wettavity is green space	Allan affer wedda		Adjusts systems play a remotion is addressed in the section. It is a factor wedging or 10°s. In additional green space	Autual systems are objective and part of american burchen, 1 - 3 acres of welland created or 10 - 25-	Antentative Lifty ubog naunal synthems, 3.5 school of method cheeked or 25.50%, additional grown space.	Attentative mustry in male- tion natural system decontraction, 2+ acrite of welland or 20% additional		i ja
Multiple-Use Facilities	Constructed facilities permanently elements recreational opportunity	Constructed facilities significantly impain lectational opportunity	Constructed facilities moderately impare recovisional occortants	Constitucing facilities have minor impacts on	Construction (amporantly impacts necessforal)	No impacts on recreational opportunities	Albiruthe ingroves accrets to existing	3	Alternative significantly enhances recreational	Allemative increases recreational apportunes in	Anomoseo meuts e muts		(3
Source Control of subwatershed pollutant loads		Politiker loadings are increased by 30 - 50%.		2 2	End of pick polutars Coadrigs impacts are Coadrigs impacts are	End of ppin poliutari loadii ga ene unchanged	Polisher todogs erpacts are reconsistent, but lawy tower		opportation Source control redicas petitifier eachings by 10 - 30%	Source control reduces portulari leadings by 30- sces.	7.00		3 N
Non-Obtrusive Construction Techniques	Permanent loss of green space or ponentry stras dangeon	Man froroughtain closures. Sentitive and temporary demotivors.	Worspread dust and noise, blanking, woonday street copures	Uscallayd dust, ness and local wheel chouses	Minor dust and noise, traffic lane closures	No construction impacts	NA	ra.	NA	74	NA.	Chapter or may solve and all make	W
Consistent Land Use	Intrakte of navance fibilities econsistent with mighterhood or land osa	Facilities occursolant with engridomicod of land use.	Pacifity Characteristics militarised to reduce impact on resignosmood	Pacities have regaticant impact on development density or land use	Facility has mind impain on development Jensely or and use	No mose on land use or no above ground tacknise	Abernary a mingales orithing compatibility problem	Adematica removal facility recovering with accordance out	Attendance removes. Pursuance facility from	Alteriative subsuces property values or	Artemative provides oviruncements that standarding improve		a
Impermeable Surfaces	5 acrets of impermeable surfaces are added	3 - Sacras of imperminable surfaces are added	1 - 3 acres of erpermeable soffacies are indeed	up to 1 acre of impermeable surfaces are added	Mance increase in Impermulate surfaces aband	No change in impormulable surface	1	withour walke	1 - 3 aznas of impermeates surfaces nemocial	3 - 5 abrits of ingermeative	Mon that 5 sciet of importable surfaces		-
LEEDS	NA	NA.	ay.		Not	LEEDS not application or LEEDS score + 10			LEEDS Sever	LITEDS Good	LEBOS Planum		
ructions: (1.) the total scon	Score each alternative in e for this alternative in	for each of the eight a this value. (3.) Shaded	aspects of the value. S	cores can be positive if flaw*. Afternatives	re or negative, depend that score in this area	ing on the impact of the	instructions: (1,) Score each alternative for each of the sight aspects of the value. Scores can be positive or regalive, depanding on the impact of the instructive on the value (2,) Shaded area regresserts "fatal flue". Alternatives that score in this sites should not be proposed.	us. (2.) Total the scores	for each aspect to		Total Raw Score Calculated	heculated	7
Aspect	Rationale						Measurement Method	thod	1		Total Score (Delault)	elault)	7
Non-Renewable Energy Consumption	Boo theridy substants ecold provides penalty points for fa	Boo they day wild provide the transcribed to particle consumination into non-nonevable provide, Benchmiground and pervalent pervalent provide for high moneyy consumining alternatives.	mers of non-tonewable oneign		онту втизу сотчатовое араны сотчаньст	skenik socordany instiment	Evaluation of primary energy, consumed at the WCWTP per	Reveluence of primary energy consumed per MG of flow triaxied companied to the annergy consumer MG Viriam to the WCMTP per MG Viriams.			calculated may be mor will be calculated.	Note: The total acore calculated may be more than 25. In the instances where this might occur, a default maximum score of 25 will be salculated.	nis might occur, a default
Use of Natural Systems	Natural typitams implace cons Options that enduce wedgesta	Макка и укуления инфакци сопсковы ило маке сосновленоем инть инв всеком взекада изудном, солове Сурком тим имаке инфакци интерпем троко эрк рокаду усунка.	wer bottom storage rapiden somits	cted beamfet.	men gerdens vib. that increase priem space of runnas and		Acres of westerds and other for fullylectrum evaluation of the To	Acres of exercision of other hopes of groon souch extension is elementa- tionally to the trace of the alternation of the alternation.	chimenates Atro-tecturies of 00 gray				
Multiple-Use Facilities	Econemic socions creates dend water-based recreation	royenza i senda par badasa; duana di paga pagabaga badapada senda senda kina-paga Junya senda par badasa; duana di paga pagabaga badapada senda senda kina-paga senda di paga paga bada paga bada	both water based and operary.		Related of English Armstein, 19419, walling swimming att. edging to		Subjective exaluation of change resolt of better water quality, in the cover or vigitalist deathan	difficition existation of chappes predicted in the Applicit or sparan previousliss at head of bease state galary, accessed base from 51 distributed from poster inchesced from cone or supplieted feature state that	a de transcente de				
Source Control of subwatershed pollutert loads	Controling politics, loads at pre-	Corporing potatan) latas at the scarce trength terms of moderation, product replacements or stor- oper beamment requirements.	modification, product replacing		en menger makenya di kaling di makenya serupuh serupuh serupuh serupuh serupuh serupuh serupuh serupuh serupuh		Nobeled und juig political lobbing inductions in celulater by the BICC Were Dustry Toy of by conseason to the date is glass or pict program measurements.	báng rockcinova sa calcidated flant válues oz piet program m	In the RGC Water Duality centrements.				
Non-Obtrusive Construction Techniques	Probable constitución moacu	o'delde constucion moans, or each, note and use the all mostains of the limeascase of an an notecon	o all mousturies of mortimoten.	emaliye	Construction impacts get person points for creating residence		Subjective evaluation of procedia construction envisored for the elevenages	BA construction replace cases	replaces cases on the type of consumstant				
Consistent Land	Atematika configuration cahi- sahile pomp slation cali bir la landscaping, and a communici	Approximes configuration so helps or enhances or detact from the suntaneing property. The exemple sales years all detacted or as the dependence that my post in which helps the defense of the supportance or it is also dependenced. The supportance of the community garben or other great spaces as declarate the insupportances.	if the surrounding property. Further nogs in with the noighborns is about to unfurrou the reages.	Forkmore, an extremely and load. It is imper parties of his sortions.	mylet dit estemaj urituality parsu kalancico bansay, smelly, and upy. Il a larger parcel of hele is a waterla, a pump strioni can be nobleen ironi.	of the	AT THE SECOND THE SECOND SECON	can be delined to sepal regals ding on the availablety of long, we project defection and burge	e impacts on the carboncaments are the to definition, not devect				
Rufaces	Adding Impentionable surfaces Curry Interly, permisable surface	skidang ingommatika suchacos archacos kosta aucet viduens, posit nordi florestes, and lies assat l Commentes, permustike suffaços can indice ficer uniques and prisios, and prisios theory modes	e, peak runof flowrates, and bind pid peaks, and browne facing	A SSAL VERNICATION OF the william	brient deposited on the surface thom any square		Acres of poempatia surfaces prosted or over	hidded or commission					
LEEDS	LEED arendons are appropri	LEED associates are appearable to arternatives that nothing above ground tricing stachases	Move-ground transfer statement	ž.			Assistance of LEED mail above	Diserts					
Acronyms BGC - Bearginss Cr LEEDS - Leadership	Acronyms BGC - Beargrass Creek LEEDS - Leadership in Energy and Environmental Design	nental Design	23	MG - million gallons WCWTP - West Counts	n gallons								

Q MSD



### SSO SSDP Modeled Solutions Project Fact Sheet



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

Proj \$ Summar



### **Project Cost Summary Sheet**

Project ID: S.MI.MF. NB06.M. 01.C.B

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

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

Printed Date: 6/18/2008 Estimate Date: 5/16/2008

Cost Estimate Description		Totals
Estimated Open Cut Sewer Construction Cost	69	617,000
Estimated Tunneling Construction Cost	69	
Estimated Off-line Storage Facilities Construction Cost	69	,
Estimated I/I Removal Cost	69	,
Estimated Pump Station Cost	S	832,000
Estimated Flow Control Structure	69	
Estimated Earthen Basin Cost	49	
Estimated Force Main Cost	69	,
Estimated High Rate Treatment Cost	49	
Estimated Screening Cost	69	
Misc. Extra Cost Description:	S	
Total Estimated Construction Cost =	st = S	1,449,000

Real Estate Costs Description	Jescription			Totals
Easement Cost	# of Properties =	11	69	21,439
Property Acquisition			69	
Misc. Extra Cost	Description:		49	
	Total Additional Costs =	nal Costs =	S	21,000

Multipliers Description		Multiplier
Administration Costs		4%
Contingencies		25%
Interest		%9
Miscellaneous		%6
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 = S	2,321,000

C = Cr(Q	C = Cr ( Qc / Qr ) ^ m		
Cr = cost from tool at maximum size for facility cost curve	cost curve		
Oc = design size			
Or = maximum size for facility from cost curve			
= cost for design size Qc			
m = correlation exponent (0 < m < 1) Use 0.6 for all structures.	or all structur	es.	
EXAMPLE: For a BF facility of 500 MGD where 100 is the maximum size on the curve use.	100 is the n	naximur	n size on the curve us
C = \$41,686,164 * (500 / 100) ^ 0.6	п	69	109,489,869
C500 from Tool	n	49	208,281,000
Difference (C - C500)	п	69	(98,791,131)

Benefit/Cost Model C	ost	Cost Data	
Capital Cost	69	2,8	2,886,239
Total Present Worth	69	2.5	2,515,790

C) MSD

ENRCCI overwrite by Estimator

PROJECT CAPITAL COST ESTIMATE =

Project 20 Year Present Worth Estimate = Construction Cost Estimate =

\$ 2,613,343 \$ 2,515,790 \$ 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



# OPEN CUT SEWER CONSTRUCTION VALUE ENTRY SHEET

Project ID: S. MI. MF. NB06 M. 01. C. B.

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

Estimate Date: 5/16/2008 Printed Date: 6/18/2008

Total Cost Per Segment									\$ 82,035		
tneringliA nechU	U.	0	, 6	7 6	7	"	69	69	(A)	(A)	99
Traffic Maintenance Required	H	+	+	+	+	+	-		×	×	-
Clearing and Grubbing	H	>	,	<	K	×	×	_	×	×	-
Brownfields	H	+	+	+	+	+					H
Maintenance of Flow	r	T	1	1	1	1					
Dewatering Required			,	<	<	×	×	×	×	×	
Sewer in Rock	×	×	3	< 1	4	×	×	×	×	×	
Small Medium or Large Creek Crossing (S,M, or L)			U	000	0	0	S)	M			
Small s of Medium or Existing MH Large Creek Surface Crossing Rehabs (S,M, or L)	0	0	0	0			0	0	0	0	0
# of Diversion Structures	0	0	0	0		0	0	0	0	0	0
# of Manholes	2	8	0	0	000	0	0	0	0	2	0
Street Width (ft)	20	0	0	0				0	15	20	0
# of Water Services Replaced	1	0	0	0	0			0	0	0	0
# of New inlets	0	0	0	0	c			0	0	0	0
# of Aband'd Inlets	0	0	0	0	0	0		0	0	0	0
# of San. Service Laterals	0	0	0	0	0	0		0	0	0	0
- Av	5	5	2	5	7	8	0	0	-	0	0
Pip of 8	0	2,500	10	10	10	10	10	0.00	990	720	0
	400	0	0	0	0	c		00,	200	30	0
Pipe Size (ii)	01	10	10	10	10	10			0	0 0	0
gment ID	00/46-1	00746-2	00746(XS)	00746(XS)	00746(XS)	00746(XS)	DATAB AMD YO	00746.00	01100	01100	

= Total Length of Open Cut Job = Total Length of Sanitary Sewer in Rock

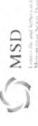
Estimated Total Sewer Construction Cost = \$

Total Cost for Construction = \$
Small Job Muttiplier =

616,724

616,724

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



## **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

831,854 Total Cost Per Facility Exclude Structure (-%) Brownfields Dewatering Required Add Grit Pit Grinders Required Odor Control "In Rock \*Estimated Peak Flow Rate (MGD) 0.2 0 0 0 0 **Estimated Total** Head (ft) 40 0 0 0 \*\*Estimated Depth (ft) 3 0 0 0 Facility ID MSD0057 8 00

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.

	0	Cluster Comparison	nparison				
S_MI_MF_NB06_01_C_B	Divert 01106, Upsize Pump Station at MSD 0057, Divert 00746	np Station at M	ISD 0057, Dive	art 00746			
				Raw	Raw Benefit Score <sup>2,4</sup>	core <sup>2,4</sup>	
	CSO/SSO ID5		Regulatory Performance	Public Health	Asset Protection	Environmental Enhance	Eco-Friendly Solutions
	01106 00746 MSD0057		21 21 12	0 0 8	ппп	ппп	òòà
	00000		0000	0000	0000	0000	0000
	Weighting Factor		360	10 130	24 0	8 72	99-
	Total Benefit Score Total Capital Cost <sup>3</sup> Total Present Worth Costs <sup>3</sup>	580 \$2,601,000 \$2,295,000					
Weighted Benefit/Cost Ratio (Veighted Benefit/Cost Ratio (Total Present	Weighted Benefit/Cost Ratio (Capital Costs) nefit/Cost Ratio (Total Present Worth Costs)	22.30					
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	n yellow ry Performance and Public Health v Costs from the "Proj Summary" Pag on existing template layout, if temple or CSO/SSO projects that require i	values are from the ge of the Cost Moate is changed mimprovements to	ne CSO or SSO Ladel for the cluste ake sure to doub the treatment pla	evel of Control E ed alternative e check referend	Benefit Sheets	ghted in gray	

z-rear			Netw	ork B	Network Branch #6	9# 1					
Value: Regulatory Performance - SS0	gulato	ry Per	form	ance	- 880	S					
Me	Measure		H	pact /	Impact / Frequency	nency		Rationale	Meas	Measurement Method	pou
Performanc e Measure	soss	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 venified.	Measurement methods will be via hydraulic models to quantify the SSO discharge.	is will be via hydraulicharge.	models to
	Value	25	16	6	4	-	0		Base	Prop	
	01106		BL		РВ				16	4	12
nbə	00746	BL			PH				25	4	21
	MSD0057-LS		BL		PR				16	4	12
Note - This value sheet calculates the total benefit.	sheet calcula	ates the tol	tal benefit								
Aconyms AAOV - Average annual overflow volume CSO - Combined sewer overflow	annual overflo	ow volume		WOS - W	Vater quality	WOS - Water quality standards WWTPs - Wastewater treatment plants	nt plants	BL Baseline PR - Proposed	Sub	Subtotal	45

01106-2YR	YR	<b>Network Branch</b>		9#							
Value:	Public Health Enhancement	alth Enhan	- tuement	SSOs							
	Measure			Releast	Release Impact			Rationale	Measure	Measurement Method	_
Performance Measures	S O S S S	Basement Area > 50,000 Flooding Cals or Park or Blue Line Stream > Line <50,000 50,000 Gals or or cals  >200,000 Gals or or cals	Residential Area > 50,000 Gale 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.	is will be via hydraulic ischarge and the GIS ance from designated	to To
ÁS	6 Month	25	20	15	10	25	0		0	0	
ouə	1 Year	20	16	12	8	4	0	1,000 GL BL	0		
nb	2 Year	15	12	6	9	3	0	2,000 GL BL	0		
en:	5 Year	10	8	9	4	N	0	5,000 GL BL	0		
4	10 Year	2	4	3	2	-	0	8,000 GL BL	0		
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00746 - 2 YR	YR	Network Branch		94							
Value:	Public Health Enhancement -	alth Enhar		SSOs							
	Measure			Release	Release Impact			Rationale	Measur	Measurement Method	lethod
Performance Measures	soss	Basement Flooding or Park or Blue- Line Stream > 50,000 Gals or >200,000 Gals	Basement Area > 50,000 Flooding or or Park or Blue - Park or Blue - 50,000 50,000 Gals or 0 or or 0 cals	Release 50,000 - 99,999 Gals	Release 20,000-49,999 Gals	Release 10,000 - 19,999 Gais	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 quantily the SSO discharge and the GIS to establish relative distance from designated tocations or objects.	ods will be vis discharge ar stance from c	a hydraulic models nd the GIS to lesignated
Á	6 Month	25	20	15	10	2	0	10,000 Gal BL	5	0	5
oue	1 Year	20	16	12	8	4	0	30,000 Gal BL	œ	0	8
enk	2 Year	15	12	6	9	3	0	60,000 Gal BL	12	0	12
rec	5 Year	10	8	9	4	2	0	100,000 GL BL	8	4	4
4	10 Year	5	4	6	2	-	0	150,000 GL BL	4	4	0
Note - This value shee maximum score of 25.	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.	verage benefit over	er the recurrence	ntervals. A corr	rection calculation	is included in c	order to obtain a	Average Total Score	Score		9
Acronyms CSO - Combine FC - Fecal colif GIS - Geograph	Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system	BL - Baseline GL - Gallons						Corrected Score	ore		10

Measure  Measure  Residential  Residential	Release Impact Release Release S0,000 - 20,000-49,999	-				
Measure  Residential Basement Area > 50,000 Flooding Gals or	0					
Residential Basement Area > 50,000 Flooding Gals or or Or Park or Blue- Park or Blue Can Store Can				Rationale	Management	- dela
Residential Basement Area > 50,000 Flooding Gals or or or SSOs Park or Blue - Park or Blue				OBLOGA	Measurement Method	emod
50,000 Gals Gals or >200,000 Gals > 100,000 Gals Gals	200 Cals	Release 1999 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 ervironment under their Enforce	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish retaine distance from designated locations or objects.	hydraulic models I the GIS to signated
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Acronyms CSO - Combined sewer overflow BL - Baseline FL - Fecal collorm GSI - Gallons GSI - Gallons				Corrected Score	are .	m

Value:	alue: Asset Protection	tion											
	Me	Measure				m	Impact			Rationale	Mea	Measurement Method	70
		Flood Damage	ebeum	Homes or businesses are subject to sever structural damage	Homes or businesses arr subject to minor to moderate structural damage		Flooding limits Flooding limits access to access to homes or rectrational businesses.	Standing water on property, but access not affected and no damage expected	No standing water	Summater BMPs can reduce stormwater peaks and reduce dear droped are reduced are reduced as reduced		Diamage models where available, historic custome complaints from MSD Customer information System, or historic observations of loads-promy weeks continued with the expected rishare impacts of sewer system modifications on storm water flows.	complaints from ervations of flood spects of anwor
se Measures		Basement Back-ups	Back-ups	Sewer surcharging within 6 feet of ground surface for more than 20% of manholes	Sewer surcharging within 5 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 (spically 1 - 2 livel allower glound surface, and between floors are hypitally 8 - 10 feet between the fact floor A sever surdange of feet between ground surface is furthy laskly to cause back-cups in formers with beasement service.		Measurament metlock will be via hydradic models to quantify the hydraulic grade lines compared to ground surface elevations at markoles.	to quantity the levations at
огтапо		/-	1	Most Severe Impact				Least Impact	No Impact				
Per		-	/	is:	*	**	69	-	0	Assumptions	Base Case Score	Base Case Score Alternative Score	Total Score
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	16 Year	Lesst	-	10	7	10	N	-	0		r)	2	100
	Not Possible	Not Possi eld	0	0	0	0	0	0	0	¥.	Average		N
. This value	VOR - This value sheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum score of 35	ge benefit over th	the recurrent	ce intervals. A correc	don calculation is in	cluded in order to o	btain a maximum so	ore of 25.		Tal.	Total Second		

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Arethelics - Odor and Air Emissions	Cress proving obb about affecting + 36 supports phy	Comits seruping likel in sec- afficially a 20 customers species in AB moditment or commercials	Cristis articology data traces where my A.D. cymothers documentally	Annual Contract and saving	Create thruston ado decide anythrus v. st. cristation accounting	to make he makes	Streets begins as hard sitting - 20 children i Gostone	Neutron tem tales stat states artecting v. 55 seaternes after	Personal property ones design effects from the second formation of the second ones	Concession transfered for the control of the contro	Circuit arrent late seem chemy call	And the second of the second o	i in l
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Stream Flow Impacts (DWF only)	2** Territoria e de dipelo princia accidente	obs. Shi mesani ilisa Arreg tokas tarakasa.	Only prize appear	Substitute to the Personal and Personal	Paulot seption of only up	Perspecit annual a	for the tradition of the second of the secon	manufact could or filter to com-	S. Ch. appropriate services of State No. Services protections.	Manager Services (Co. 2)	28 to perceive increase phase has dang mice. Calaban		
netractions, (1.1 St noove for this after	hele actions () Licens such attentions for such of the server aspect of the value. Ecolog bits position or regarding or hele invested by the interest of the attention for the colog. (I) Total the score for each appect to perform the result of the attention of the colog of the colog of the performance of the attention of the colog of the color of the colog of the colog of the colog of the colog of the colo	sach of the seven aspec haded over represents	ris of the value. Scores :	can be positive or negati that score in this area p	vs. depending on the in ould not be proposed.	repact of the afternative	e on the ratus. (2.) Total	all the scores for each	despect to get the total		Token	Crist New Scars Categories	=
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Value:	Eco-Friendly Solutions	Solutions											
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Use of Natural Systems	Constitucing facilities permitted to the second permitted of the second permitted or the second species about	2	convention to sense sense and papages 1.3 cops wetsings or 10, 133 costs, analobic gree- page.	Curry ucced skettner permanently displace (1-1) acro versions of up to 10% oc. (1) available green space.	Contracted taylone importably though wellends in green scales	Americans days righters to effect outsits or given space elegants, or given space	Atretative desertations nutual systems to established or establishing green system or extension.	Natural systems play a mechanic material and adversarial processing and activities of green space contained	Ablach withers are deprivately part of alternative function. 1 decree of well and created or 10: 20% additional green space	Abendance fully uses during systems at 3 scream and western dresses to 25 Spring additional green spots	Approache media in multi- ture preteat system. day elegencert is a train or evitand of 50% sphitters green spins.		٥
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Non-Obtrusive Construction Techniques	Space of strains early designed designed	Non Brensphan clesure Salsave area simporary deruptions	Webspread dust and node Bitsting secondary struct cosums	Contract that more and tocal steps constitute.	Mico dust and mose, walls: limit closures.	An errollich technischen	NA.	3	**	चंद	5	A THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN	
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uctions: (*	Instructions. (1.) Score each alternative for each of the eight aspects of the value. Scores can be positive or negative, depending on the insuct of the alternative on the value (2.) Shaded area represents "Islai flaw". Alternatives that score in this area should not be proposed.	ve for each of the eight in this value. (3.) Shads	aspects of the value. od area represents "fa	Scores can be positi	ive or negative, depends to that score in this area	ng on the impact of the	p alternative on the val	ue. (2.) Total the scores	s for each aspect to		Total Raw Score Calculated	Calculates	7
Aspect	Rationale						Measurement Method	ethod			Total Score (Delauli)	refauili)	9
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### SSO SSDP Modeled Solutions Project Fact Sheet



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

Report As of: 6/18/2008

### Project Cost Summary Sheet

O MSD

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 Printed Date: 6/18/2008

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

Cost Estimate Description		Totals
Estimated Open Cut Sewer Construction Cost	69	920,000
Estimated Tunneling Construction Cost	69	
Estimated Off-line Storage Facilities Construction Cost	69	
Estimated I/I Removal Cost	69	
Estimated Pump Station Cost	69	
Estimated Flow Control Structure	69	,
Estimated Earthen Basin Cost	69	
Estimated Force Main Cost	69	
Estimated High Rate Treatment Cost	69	
Estimated Screening Cost	69	
Misc. Extra Cost Description:	S	
Total Estimated Construction Cost =	t = S	920,000

Real Estate Costs Description	Description			Totals
Easement Cost	# of Properties =	11	S	21,439
Property Acquisition			(A)	
Misc. Extra Cost	Description:		S	
	Total Additional Costs = \$	onal Costs =	ss	21,000

Multipliers Description			Multiplier
Administration Costs			4%
Contingencies			30%
nterest			%9
Miscellaneous			%6
Engineering & Inspection			8%
Design Services			2%
Program Management			4%
Planning & Preliminary Design			2%
Performance Bond			1%
		Total Multipliers =	%69
	7312	PROJECT CAPITAL COST ESTIMATE =	1,590,000
Data File ENRCCI in use 7	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.) EXAMPLE: For a BF facility of 500 MGD where 100 is the maximum size on the curve use 109,489,869 m = correlation exponent (0 < m < 1) Use 0.6 for all structures. C = Cr ( Qc / Qr ) ^ m Cr = cost from tool at maximum size for facility cost curve Or = maximum size for facility from cost curve C = \$41,686,164 \* (500 / 100 ) ^ 0.6 C = cost for design size Qc Oc = design size

Benefit/Cost Model (	Cost	Data	
Capital Cost	69	1,7	723,441
Total Present Worth	w	1,3	396,095

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.

C500 from Tool

208,281,000

C) MSD

ENRCCI overwrite by Estimator 8550
PROJECT CAPITAL COST ESTIMATE =

Project 20 Year Present Worth Estimate = Construction Cost Estimate =

1,723,441 1,396,095 1,019,973 SOS

### 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	
Annual Volume of Pumping (Million Gallons)	0
Estimated Total Dynamic Head of Pumping (Feet)	0 0
Length of Force Main Conveyance (Feet)	0
Annual Volume of High Rate Treatment (Million Gallons)	0 0
High Rate Treatment Estimated # of Annual Occurrences	0
Screening Estimated # of Annual Occurrences	0
Screening Annual Volume Disinfected	

# **OPEN CUT SEWER CONSTRUCTION VALUE ENTRY SHEET**

Project ID: S MI MF M NB06 01 C C

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

Estimate Date: 5/16/2008 Printed Date: 6/18/2008

rotal Cost Per Segment	125,039		25,141							
	S	69	69	S	69	49	69	49	69	49
Urban Allgnment	⊩	-	-		-			×	×	×
Clearing and Grubbing Traffic Maintenance Required	-	×	×	×	×	×		×	×	-
Brownfields	⊩	-	-							H
Maintenance of Flow	-									r
Dewatering Required			×	×	×	×	×	×	×	×
Sewer in Rock	×	×	×	×	×	×	×	×	×	×
Small Medium or Large Creek Grossing (S,M, or L)			S	S	S	S	M			
# of Existing MH 1 Surface Rehabs	0	0	0	0	0	0	0	0	0	0
# of Diversion Structures	0	0	0	0	0	0	0	0	0	-
# of Manholes	2	8	0	0	0	0	0	0	2	2
Street Width (ft)	20	0	0	0	0	0	0	15	20	22
# of Water Services Replaced	1	0	0	0	0	0	0	0	0	0
# of New Inlets	0	0	0	0	0	0	0	0	0	0
# of Aband'd Inlets	0	0	0	0	0	0	0	0	0	0
# of San. Service Laterals	0	0	0	0	0	0	0	0	0	0
**Average Depth (ft)	5	5	5	5	7	5	5	7	5	13
Length of Pipe out Pipe in of Street Street (tt) (tt)	0	2,500	10	10	10	10	10	920	250	0
	400	0	0	0	0	0	0	100	100	150
*Pipe Size (in)	8	89	80	8	10	8	88	10	8	72
Segment ID	00746-1	00746-2	00746(XS)	00746(XS)	00746(XS)	00746(XS)	00746 (MD XS)	00746-3	01106	MSD0057 Stor

4.100 = Total Length of Open Cut Job 4.100 = Total Length of Sanitary Sewer in Rock

Estimated Total Sewer Construction Cost = \$

950,066

%0

Total Cost for Construction = \$ Small Job Multiplier = 950,056

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

	O	Cluster Comparison	noarison				
S_MI_MF_NB06_01_C_C	Divert 01106, Storage at MSD0057, Divert 00746	MSD0057, Div	ert 00746				
				Raw	Raw Benefit Score <sup>2,4</sup>	core <sup>2,4</sup>	
	CSO/SSO ID <sup>5</sup>		Regulatory	Public Health	Asset	Environmental Enhance	Eco-Friendly Solutions
	01106 00746 MSD0057		21 21 21	0 0 8	000	0 0 0	à à ở
	0000		000	000	000	100	100
	000		000	000	000	000	000
	Weighting Factor Weighted Benefit Score		360	130	54	8 48	-36
	Total Benefit Score Total Capital Cost <sup>3</sup> Total Present Worth Costs <sup>3</sup>	\$1,450,000 \$1,184,000					
Weighted Benefit/Cost Ratio ( Weighted Benefit/Cost Ratio (Total Present	Weighted Benefit/Cost Ratio (Capital Costs) nefit/Cost Ratio (Total Present Worth Costs)	38.34					
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	n yellow ry Performance and Public Health v Costs from the "Proj Summary" Pag on existing template layout, if templ or CSO/SSO projects that require i	values are from t ge of the Cost Mc ate is changed m improvements to	he CSO or SSO I odel for the cluste take sure to doub the treatment pla	Level of Control red alternative le check referen	Benefit Sheets ced cells highli	ghted in gray	

2-Year	_		Netw	ork E	Network Branch #6	9# ١					
Value	Value: Regulatory Performance - SS0	ory Pel	rform	ance	- 880	s					
	Measure		드	npact	Impact / Frequency	uency		Rationale	Meas	Measurement Method	pou
Performanc e Measure	SSOSS	6 month	1 Year	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 t quantify the SSO discharge.	Measurement methods will be via hydraulic models to quantify the SSO discharge.	models to
٨٤	Value	25	16	6	4	<del>-</del>	0		Base	Prop	
ouə	01106		BL		PR				16	4	12
nbə	00746	BI			РВ				25	4	21
иĦ	MSD0057-LS		BL		PR				16	4	12
Note - This	Note - This value sheet calculates the total benefit	lates the to	stal benefit	it.							
Acronyms AAOV - Ave CSO - Con	Acronyms AAOV - Average annual overflow volume CSO - Combined sewer overflow	flow volume flow		WOS-	Water qual	WOS - Water quality standards	atropic to	BL - Baseline PR - Proceed	Sut	Subtotal	45

01106 - 2 YR	YR	Network	Network Branch #	9						
Value:	Public Health Enhancement -	Ith Enhan	cement -	SSOs						
	Measure			Release	Release Impact			Rationale	Measure	Measurement Method
Performance Measures	® OSS	Basement Area > 50,000 Flooding Gals or Park or Blue Line Stream > Line < 50,000 50,000 Gals or or Stream > Line < 50,000 50,000 Gals or	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.
٨c	6 Month	25	20	15	10	ıo	0		C	0
oue	1 Year	20	16	12	8	4	0	1,000 GL BL	0	-
nb	2 Year	15	12	6	9	3	0	2,000 GL BL	0	
91:	5 Year	10	8	9	4	2	0	5,000 GL BL	0	
4	10 Year	2	4	3	2	-	0	8,000 GL BL	0	
Note - This value shee maximum score of 25,	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.	erage benefit over	the recurrence in	ntervals. A corre	ection calculation	is included in or	rder to obtain a	Average Total Score	core	0
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information sys	Acronyms CSO - Combined sewer overflow FC - Fecal colliom GIS - Geographic Information system	BL - Baseline GL - Gallons						Corrected Score	ore	0

00746 - 2 YR	YR	Network	Network Branch #(	9							
Value:	Public Health Enhancement -	Ilth Enhan	cement -	SSOs							
	Measure			Release Impact	Impact			Rationale	Measure	Measurement Method	poq
Performance Measures	sooss	Basement Flooding or Park or Blue- Line Stream > 50,000 Gals or >200,000 Gals	Basement Area > 50,000 Flooding Or Or Or Stream > Line Stream > Line < 50,000 Sy,000 Gals Or	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.	is will be via hyd ischarge and th ance from desig	fraulic models e GIS to nated
Á	6 Month	25	20	15	10	22	0	10,000 Gal BL	5	0	5
oue	1 Year	20	16	12	8	4	0	30,000 Gal BL	8	0	8
ent	2 Year	15	12	6	9	3	0	60,000 Gal BL	12	0	12
rec	5 Year	10	8	9	4	2	0	100,000 GL BL	80	4	4
4	10 Year	5	4	3	2	-	0	150,000 GL BL	4	4	0
Note - This value shee maximum score of 25	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.	verage benefit ove	ar the recurrence	Intervals. A corn	ection calculation	is included in c	order to obtain a	Average Total Score	Score		ω
Acronyms CSO - Combined si FC - Fecal coliform GIS - Geographic in	Acronyms CSO - Combined sewer overflow CSC - Fecal coliform GIS - Geographic information system	BL · Baseline GL · Gallons						Corrected Score	ore		10

	שבי שבים	Public Health Enhancement		- SSOs							
Me	Measure			Release	Release Impact			-1			
				Depoint	mipaci			Hationale	Meas	Measurement Method	Method
Performance Measures	so oss	Basement Area > 50,000 Flooding Gals or or Park or Blue- Park or Blue- Line Stream > Line < <60,000 50,000 Gals or > 2000,000 Gals	Residential Area > 50,000 Gals or Park or Blue Line <50,000 Gals or > 100,000	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		ethods will be v SO discharge a s' distance from cris.	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.
	6 Month	25	20	15	10	22	0		c	0	c
	1 Year	20	16	12	8	4	0	6,000 GL - BL		0 0	
	2 Year	15	12	6	9	3	0	25,000 GL - BL	100	0	o u
rec	5 Year	10	80	9	4	2	0	60,000 GL - BL	0	100	0
-	10 Year	5	4	3	2	-	0	100,000 GL · BL	4	4	10
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.	ulates the ave	rage benefit over	the recurrence in	ntervals. A corre	ection calculation	ls included in o	rder to obtain a	Average Total Score	core		2
Acronyms CSO - Combined sewer overflow FC - Fecal coliform GIS - Geographic information system	flow	BL - Baseling GL - Gallons						Corrected Score	ore		6

Value:	Asset Protection	tion											
	Me	Measure				E .	Impact			Rationale	Mea	Measurement Method	g
		Flood D	Flood Damage	Homes or businesses are subject to severe structural demage	Homes or businessers 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 atomicater with a produce areas, while a profession may retrained areas, while store's reduction may retrained increase increase to be looking invested of storein reducing increase the looking invested of storein profession with the reduced produced in the pr		Diamage models where available, Isration custome completing from MSD Customer Information System, or instoric observations of lood prover areas combined with the expedited trative implicits of severingstem modifications on sturm water laws.	8 2 8 6
se Measures		Basement Back-upt	Back-ups	Sewer surcharging within 6 teet of ground surface for more than 20% of manholes	Sewer surcharging within 8 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 hour levels are hybitish? 1 - 2 feet above ground surface, and basement floors are hypitally 6 - 10 feet helour the first froot. A sever surfarge of 6 feet below ground safete is night, likely 10 cause backery or on homes with basement service.	w Measurement methods i hydraulik grade lines cor manholes	Measusement methods will be via hydraulic models to guarnity the hydraulic grade lines compared to ground surface elevations at manholes	2 3
ormano	Chroma II	/-	1	Most Severe Impact				Least Impact	No Impact				
Pen			/	in-	*	60	6	-	0	Assumptions	Base Case Score	Alternative Score	Total Score
	6 Month	Most	in	\$2	50	Ü	01	6	0		10	ID.	
	1 Year		*	20	9	2	ю	=	0		83	4	
neucì	2 Year		e	5	53	o,	10	-	0		9	9	-
Freq	5 Year		64	10	80	ic	*	less.	0		4		-
	10 Year	Lessi	-	ю	· P	О.	12	н	Q		173	a	-
	Not Possible	Not lesoq eld	0	0	0	0	o	Ö	٥		Average		-
Note - This valu	dore. 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 Addressman.	age benefit over	the recurren	ce intervals. A correc	tion calculation is in	cluded in order to a	blain a muximum ac	ore of 25.	B	To	Total Score		

C) wan

Value:	Environmental Enhancement	Enhancement											
Aspect Assettle and	П	4	7	4			Sci	pung 1	1		-		
Toregulal Habitat Protection	Manager plants is not a	present it common beauty	Elements of retail sequents of comments of	Sandour habit represent	After impressed a miles	Say inspect on they had	Mod urhancement of second makin	Sqritter strandered distributed	Coase if this moons a	Colors of squares arrang	Coulogy of process August 19		Score Hay Aspect
Amithelice - Solids and Postables	Mar with the scales of August of August of August of To Safe, sales	Distriction and printers in Distriction (Distriction)	S. No. 3 for art of \$40 mental	(P) to the service (L)	Medical eligenty of resimp SAF partial design is "thys of this saft to SAF remains	No charact. C. SAT Landania	To the state of th	10 - 25 % of Sucharyan from scaled odin promise SAF comme (accepted)	26 - 107- of Eucharped Ser- tracted with promose SAP removal recitorio	2.5.1	The sale and the s		,0
Aestratica - Oser and Air Entissions	stimet ago čalouje smiljo	Cetts imperij olib saure ilitera i 20 supremi enseculi	C tate securing one source efficiency of the camera included with	Coare amodites non social Probing - 18 inchestes inhi-	observations where the control of th	Ab mpact on sport	Appealar 3x ( southern 2d + Bullande (2) mill 2d + Bullande (2) mill	Obereits discusses side South Photogry 1 kB colormy 1 free	Elevain recopy state traces alming c.55 furthern Recataculy	Checker emberg are ware effecting. 28 culturers gives at 12 halterine batterinesh	sitel candons (2) but has a reta site builture serventy	a la como e con la la como e con esta companha de la companha de l	
Dissolved Onygen Impacts	Personal Control Contr	a di addisina (portania)	Common ediction of a common of the common of	internation spaces of in mean Tri ) and a propose white control and condition during in the condition	Presentation (MATCH) in the State of its Sta	talkin qua	N places DO 3 Trape	medical majorament of the control of	Cathodas indicated it is more COS - 2 mg/ more costs that incides management it ng/	Cymu. Mel. Prop Novemer 20 de dreper 20.0 f (mg) c	Character expressed of pinks together instants 00 fines (		-
Ocumplisham Impácta	TYL contage in preside 6000 or supress forms	HOC of Author care	25. SP's extracts in arrows BCD in surface (salts	10-25 solate in press BOtto notes tony (200), suite),	POSTAGE C. IS S. PARSON A POSTAGE BATTLES OF AMERICA SANTAGES OF A CASE	A TOTAL OF STORY AND A TOTAL OF STORY WITH THE STOR	9 (Prejdoten a senal BCD s - mer sage Cap	on an electron in some fiction referred	21 - ST- Inherbot in sense BOD or neverth sales (CSD -	Mr. Thumberton a pro-	70- Jahrayi e seuse 800g when take 200		
Stream Plass Impacts (Posk Rows)	20% - retirent it push filled.	10. St. remain r pro-	of the characters of page.	Property common in the	Provide intrinse in periops for it mind inclinate. Net fine plats	1 .	Mrs. Inductor or base no spectral post inductor		the fire relative in pass	And of the reduction in Fig. 1998.	parent. 27% refection in posit bons	Assemble Company and Company Company	
Grassm Flow Impacts (OWF orly)	Principle of Section (1997)	One 1811 am sept in the design of the september of the se	A fire Adding order	Area citica centery	of act of the sea and action	A Second of second Max	organical transfer or	triorities against e others line. Terri record on a cardinary	C. 10%, personal number dimension purity ched sections	6 - 58 * personel terrain it their the Acra chas	21's arrivable system is three fine hary critical systems		×
Fratruplique. (1.) score for this all	who allows (1) Stors each administrative social of the sevent september of the value. Scene cash of the sevent september of the value. (2) Storage from the sevent september of the value of the sevent september of the value of the sevent september of the sevent representative of the sevent representative of the sevent representative of the sevent of the sevent about on the proposate.	ach of the serven aspects aded area represents "h	a of the value. Scores	can be positive or meats that score in this area at	var. Sepending on the in sould not be proposed.	space of the alternative	1 on the value (2.) Tols	if the scores for each a	sepect to get the total		1	Total flows Street Columnics	9
Aspect	Rationale						Measurement Method	ethod			Tag.	Total Sport Delaway	-
Aquetic and Terestral Nabiast Profection	Me wollen prodet in en stechnologiel, and tempet help altered though it has the real the real some paint, the steen paint, the steen paint is the characteristic or the description of the steen series about a steen paint.	rated from again, and the strongle made to another modes to another made to another made the strongle method made the strongle method made the strongle method made to a strongle method another strongle method and strongle method and strongle method another strongle method and strongle	erestral tables Proceft britishere vol wouther oor med to extends future po	Changes in Least Son, 1968 World floatsaves have a lensk coeffire and impained empair	A fee, sale qualit, the led ability to predict tasks, to	cover, charms shape pool diversity charges	Project delimines may a livel comparation their and other water quality path flow rates to alpa buildog ama	pochtaly admission own cover int. Presche m impacts Pays modele a admission changes in	Proget delinear may geofficial, admission chayde in channel studio and comparative tree cover inc. Preaches models, all activists CO. For come water could propose "the incodes and prode later free and but they are the channel and they are controlled in decided and under butbog area.	Webs. The total score culculated may be more than 25. In the instauctor cate; delet	tripped wey be more to	and 25, in the Graduiths whose this mayel social, a selbuild reponents societed 25 mill by	avernorn sectors of 25 mill by
ord Floatables	Med CDD, have some storm is seek and foreither controllers, intercomments in subject sites into reacoust an increasing a time.  And White induction is softly and figurables introval effecting a not lawly proofs justice, and as a service in a simulation introval.	of solets and focusibles in Stam with reference, also and foculables remove	controllatties ingrove constrated violands, as all differency and likely.	ments a capture sales cai break como systems in break south on be asset	the special with spring the free is prouble with		Cumber posts and legals as sheet with control lacks and the safe of the safe and the safe and the safe and the safe and the safe declarated lack sproyed lake.	COTOR INC. IN VALUES INVOLUTION IN THE COLUMN TO THE COLUMN THE CO	his been extended to an opnosal efficiencing securgia option med in precised for vel beset on pucketing				
Aestheica - Oder and Air Emissions	Other and a transport can be provided a bloogy spales, forms about less many extravojat deaths. Other are provide, transported by the forms the provider of th	an be generated in alcoholy in quality of the color. Cost, less.	ections, purp statement are extended are	Hoster many and sog lat	of others resulted and		Oos amistacra from ser merchy, duality, and pic merch devolution in rost are communication. The preserved based on your frontip drus member of	Our ensurement how everyge fractive tracks as indicated by the control of the con	dan be macood by moment purposes the other entire in vary in emergent will be an emergent will be be friend the				
species Daygen species	Descried oxygen	the distribution in the section of t	by of faction on keinig BIO	Jack Frenchised.	Philad No stack age to	The maintenance with	or 85C the Water Gual strong condition of individual projects will before strough condition	FOR SIGN WIRTH TOURS, TOOL AND TO LOCATIO INTERNAL THE IMPORTS IN HOLD AND CONTERN THE PROPERTY AND TO THE PROPERTY OF THE PRO	ribrium the models of mr. Probable include complements to the				
Dernatizaars spects	demonstrate highest vide to coldinate in a Day the below adments clearly stands stading in the list use an intersol country has been been been as the list use an intersol country has been been as the list of th	to conditions in the Dieg F O - 85% of the hotal rules marked impacts for Acerca	the bath recting the Gallere	unty Nutrain stagings in th 7 of Mexico, 900D is not ta	to Otto Inci just jetnings only to primite in the most	in County! Nave been Plant and end end end end end end end and an and and and and and and and an	oblass mecenis will be recage tods, and the of companies	Poblates meterate will be retroised baled on motal-trong in providing to bods, since the demonstrator impacts are printed to ony term and carried to one services.	this form in provail in primarily one sum				
Stream Flow Impacts (Peak Novel	K elektronsky negt polsk filmmy as and other caused by make nather behand montation untake in Propagation		elementation of a receiped	decreases of a recommend can enable me streament	of damage beading and	Section between	indicine modely same of heroes, and the Water of dendry amount hows due	Penkalie mobile sati nëmale Nje pedang skoos hore eshotasi Sovresa and the Water Judie Pool has a histoake compileer to claterate ahsan funs dang samas som eners	on how erchaust alc comprisers to				
bysen Plyse rysets (DWF orby	Cheester of Year, ang hard assembly can retrieve that they will bond call the case of Year, will bond call trying.	A stream dui to abunda stir bumping can rechouse	reterl of a treament pla		thick base four it a littlem . Atomiskiby	after partici	michine modes car est ene Quality Too has a might enoughly weather	Plack, vie modele u.e. estende kues Innn siderdaal poursa, and me Viene Caste 7,00 No. In Forsia, Computer in defende steam from Outry senous dry westers enerts	welvource, and me elderate stream fown				
Acronyma 90C - Bear yass Cross 80C - Broopst onygen donand CSO - Conbead seems overfee	real right domand web comflow	225	DC Equated single DMI - Dry amather from myl - Magnas per flor	- 8	Std. Notes and flaglables								

C) MSD

MF	S MI MF NB06 01 C C												
value:	Eco-Friendly Solutions	solutions					1						
Aspect	N/I	· ·	0	Ġ.	- 4	0	Sconng	ang a	3.	-	99	Assumptions	Group Ste headed
Non-Renewable Energy Consumption	After An, Benings Cont. umption is greated than secondary bealtment	Prondity desirity Consumption regulation 75 - 100% or secondary Supringed	minus knowy) mountain equal to 30 on of socondary waterers	Provincy invirgs contamposon equal to 16- 30%, of secondary seamond	Primary unlergy consumption repeal to 0 - 15°- of 6000/GMV treatment	No enalgy contingpor expects to present and insertingense	Cicaring and maintenines run reided in primary (meromption	PA.	44	414	Table A	sayundunise.	SCUID FOR ABJRICA
Use of Natural Systems	Control of the their parminently deplice 6- acres withouts or 60°, locally an all-oth green yakes	Consistant displays promises of displays 3-5 displays 3-5 displays and display as all admit prioring a page 4-	owarusted facilities emanger graphs, v. 1-3 costs wellands or 10 - 15% cally available green pace	Controlled Incident permanently deplace 0 increase of the sector welfacts to sector of the sec	Constitution factorists, bringing sentands, for great signals.	Architect doct not sail or all not stated in priving welfants or green space	Assertative obsest on its naturally spidios, tol enhances given ablest po recibori	Value a Systems play a mero miss in altership of herbor or or 1 zero wellond or 10. and series i green apain.	Natural systems are support, all part of alternative (unches). It access to welland consist of 10, 25% additional green again.	Abumative fully uses easiest systems 3 -5 alous of wetters consider or 22-32% additional green space	Allumation marks in male- der cathodic ligation der elegeneral 2- as rea of selfund to 20% additional green space		
Multiple-Use Facilities	Contracted facilities permanently empeting naturalities appending	Constructed technics significantly impairs recreational opportunity	Constructed facilities moderately ergobe relocational opportunity	Constructed facilities have minor impacts on normalizeral depoliturity	Construction temporary migable 44 restorial	No matter on remediated opportunities	Alternative improvery access to entiting	Administrating Institution Dokury Impact on noticentary	Afternative significantly implantes increations	Atamothy increasing increasing appropries in			
Source Control of subwatershed pollutari loads	Principal trainings are architect trainings are	Pollutera Garage and Acrossoc by 30 - 52%		End of type poliutari toalongs are increased by () 10%	End of pice polistant roughtigs mighting are reconstrained. But likely higher	Ere or pipe powdent eadings are stickel god		Share is a substitution of the line.	Soute cellul redicas. pollusmi losdrups by 10 30%	Source common results promoter madings by 30.	Source control inductive potential trushings by mole trush VPs.		-
Non-Obtrusive Construction Techniques	Pernandel loss of green specin or sembly erran dungson	Man troroughlare doums sensive whatemproory disruptions	Widespread dust and more blaking secondary street chaumer	Localizate dura, mose and local street closures	Menor data and noce, treffic Nerse Ovisions	No construction impacts:	42	44	919	1	12		=
Consistent Land	Intrative or manance Incides inconstruct with neighborhood or land use	Epiciery inconstitution in resplication or land to a	Facility characteristics mitigates to reduce impact on resignatives	Facilitat have significant impact tim devalopment demaily in their time.	Facility has minor enpaid on universipment dentity of land yields	No organi on lates use or ro- above ground facilities	Attendance megados existing compatibility problem	Alternative removes lacitity of promisition with nographorization	Attemato e remou est musures tackly from neighborhoot	Alternative enhances propunty values in neighborhand	Attendance provides orthogonemic that south any marks of		0
Impermeable Surfaces	Sacross of Impermisable surfaces are accident	3 - Sacres of impermulation surfaces are added	1 - J. aches of emplemetable sucher es are pipped	up to 1 acre of impermutate sudisces are added	Marce increase in an added in sperimental and an added	No change in incerneable surface	Mesor indicator in impermotate surfaces	Up to 1 acre of importmentals	1 - 3 sons of impermissible surfaces introvid	3 - 5 acres of molemeable surfaces surreved			0
LEEDS Performance	170	***	No.	NA	74	LEEDS not applicable to	LEEDS Score 10 29	LEEDS CEASON	LEEDS SAver	LEEDS Cold			5
thuctions: (1.) t	Score each atternative is for this alturnative is	Instructions. (1,) Score each attenuative for each of the eight aspects of the value. Scores k got the total score for this alternative in this value. (3) Shadod area represents "fasta flaw".	aspects of the value	Scores can be positi al flaw*. Atternatives	an be positive or negative, depending on the impact of the al Atternatives that score in this area should not be proposed.	ling on the impact of the	can be positive or negative, depending on the impact of the alternative on the value. Alternatives that score in this area should not be proposed.	lue (2.) Total the score	(2.) Total the scores for each aspect to		Total Raw Score Calculates	Calculation	79
Aspect	Rationale						Measurement Method	lethod			Total Score (Dahwit)	wheum	7
Non-Renewable Energy Consumption	Eco mends, selezons would provide portal for	Eco heredy, sekatrosi would no exposited to be low consumers of mor-resemble energy. Dere presides persify poem for high energy consumers alternatives	umies of nep-rigiowalsis arms, allying	n Derekintarking resetty rank	produces a particular granders and between the production	al secondary troproperty	Evaluation of primary energy consumed at the WCWTP p.	Beaumons of primary transp, contains of po-Mul of the builtest comparent to the newsy consumers at the WCMTP parallel sealed	abut consult to the energy		calculated may be mo 5 will be calculated.	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.	is might occur, a defaul
Use of Natural Systems	Natural systems, replace of Options Plair reduce weight	Хилий бүсэнэг горсон мэгд умэн заас дэвэс солих сан мэг бэгсэсэн холуу наром, сон Орсон Түй, тоосси могиса, алд умэн хажс эрг Босай, раны	with wet bottom attencys ingentily golden.	Straight Earnwaren	margesteral in But ecousty green	r green space of národa kinde		менталога доб глло в крсь од проет удела изваза от вененичес набез тем ем адабила и Рев Съвай се във аванеция, превет се супер	or stimmwert. Also includes				
Mutule-Use Facilies	Leo Mondy sounder crid dies,f water based recrean	LEP ROOM, GUICHO ERCHELON RECORDING TO DOTH with classes and provise mechanics. Recent y serves, Academy, fulling, waaling, assimining esc. sought on Jane Hande Internation. Ben without strong protecting camping for would be considered mistad operations reclaims.	x beth wherebased and operang personal personal campaig on, we	ule be considered maked in	ong Aayahing. Hahing, waaling	s airmining etc. Mould be	Gudgetter in acadebre of the ment of tempt water quality, true could be implicated rights	Distriction evaluation of challege praction in the Applic or consumeration in a distriction of september of the public properties of september of september of the public protection of the public p	or open an environment as a safety from peaks systemated				
Source Control of subwatershed pollutant loads		commeng pointain tools at the source through banknot models aton, proced these smooth of	o modification, penduct replace	strematic	to the Bulgions (county spenished engine state) and spenished to the country of the state of the	dicharis tireupy avoiding and o	Modelen bind full polistics. Tool or by comparison to list	Modelec bind step politics blooding teducions as calculated by the BICF Walse Dusking Took by companieses to literatura vilsant or thing program rectal/promotio	ed by the 8GC Water Dustry meldsurements				
Non-Obtrusive Construction Techniques	Produble bonstruction impo	SOURCE CONTINUES PROCES OF TATIC HOSC and dust are all measures of the feeralines of the feeralines.	are all measures of the freezing	Adematic	Controctor injusts get penalty peina for creating natural	something professor by ended	Subjective evaluation of pro- enymestried for the alternative	SURECINE Exhlabler of probable existiction reports based on the type of condi- ennacined for the alematics.	sector. The type of conscious	1 5			
Consistent Land	Alterhaliva configuration d. same pump station can be terblicaturity, and a cummit	Alexandes conspandes can entre produces a describor the synthology project. For example, an intermed uniferral points determined to receipt and upp. The sames professional and the second points and produces that the system is a produced from a set of the second points and produces that the system is a produced from a set of the second points and the second points are produced to a supportation of the second points and the second points are second points	on the surrounding property. At its right and the meghod are added to enhance the hill	For unampte, an exhibiting fricos it is lenger permit of procession	unimently portorstantin can be lared to available a porty state	o now, smely, and ugy. The on pain by holder from varie by	At the pusheing lines, project is furnounding proporties. Dep possible. This aspect encura	At the publishing three projects can be defined to avoid negative impacts for the surrounding properties. Depolating to the installability of butt, enhancements her possible. This aspect encousages project enforces and budges to entrances not determine.	pathry impacts on the inclinitiation are digest to enhance not not needed				
mpermeable	Adding impermudale surfa Comment, permudale sp	AGENQ IMPORTACIÓN SUFFICES POTRALIS (RELINANTES YOUTHE PONÁ ALMY ROMBINES AND THE USA Commención sufricas de masoc hous victume and posses, and preciól fotomic minicia	other peak named Revealed and and peaks, and previously fater		entypot of eny poliutani deponded on the surfa	the surface from after source	AZZES OF DOFFMATOR FUFACON SZEATANI ON	A createst or minnested					
Performance	LEED standeros am epplic	LEED standarts are applicate it, attenuals as that soluts altra-equated besting snockless	in abrevious diseases sent	and a			Application of LEED residuative points	ive, posmit					
Acronyms BGC - Beargrass C	Acronyma BGC - Beargrass Creek,	The Control of the Co		MG million gallons	MG million gallons					-			

ON NSD



### MSD SSS Initial Solutions Development Summary Sheet DRAFT



DOCUMENTED SSO IDS: 00746, MSD0057

MOP IDS: 00735

SEWERSHED AREA: MIDDLE FORK

**NETWORK BRANCH ID: MF # 6** 

		OVERFLOW VOLU	IMES (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.



### MSD SSS Initial Solutions Development Summary Sheet DRAFT



Other Alternatives: No other alternatives are currently proposed.



### MSD SSS Initial Solutions Development Summary Sheet DRAFT



DOCUMENTED SSO IDS: 01106 (VANNAH WAY)

MOP IDS:

SEWERSHED AREA: MIDDLE FORK

**NETWORK BRANCH ID: MF#6** 

	9	OVERFLOW VOLU	IMES (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.

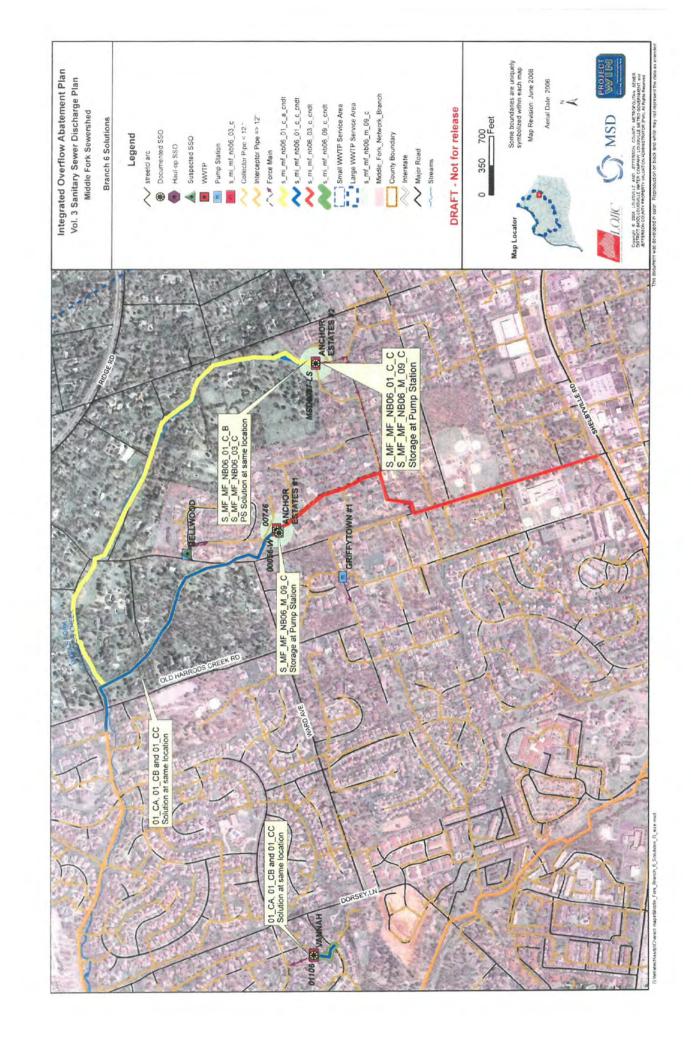
### **Alternatives**

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.

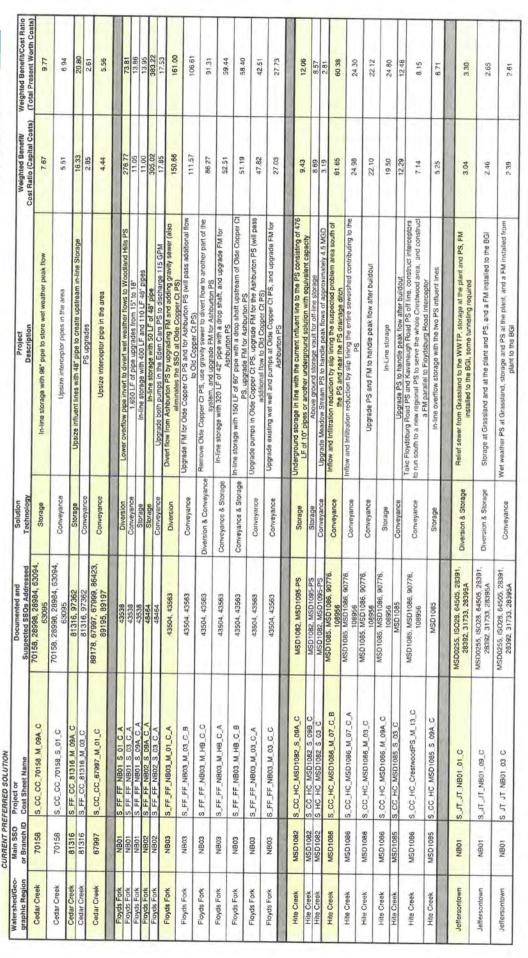
Conveyance Alternative: Upgrades to the pump station is all that is required to convey peak overflow.

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.

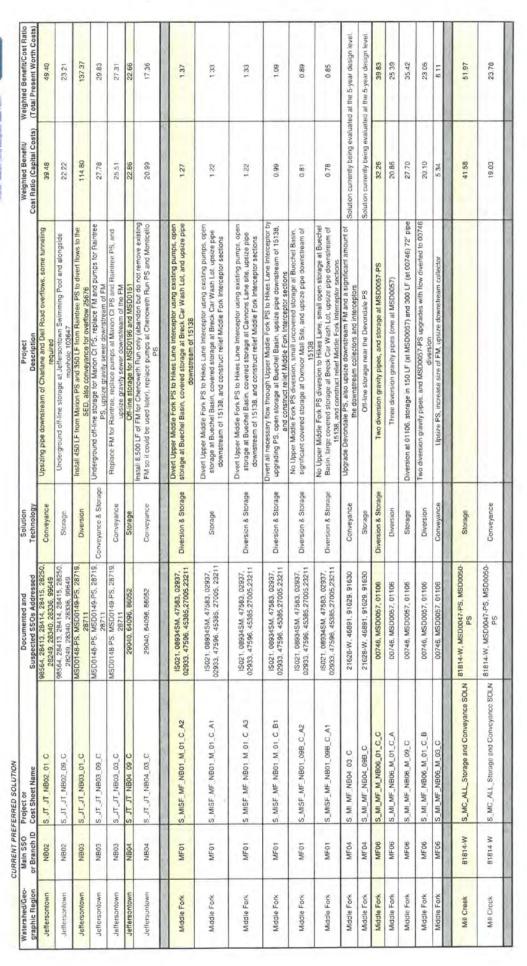
Other Alternatives:



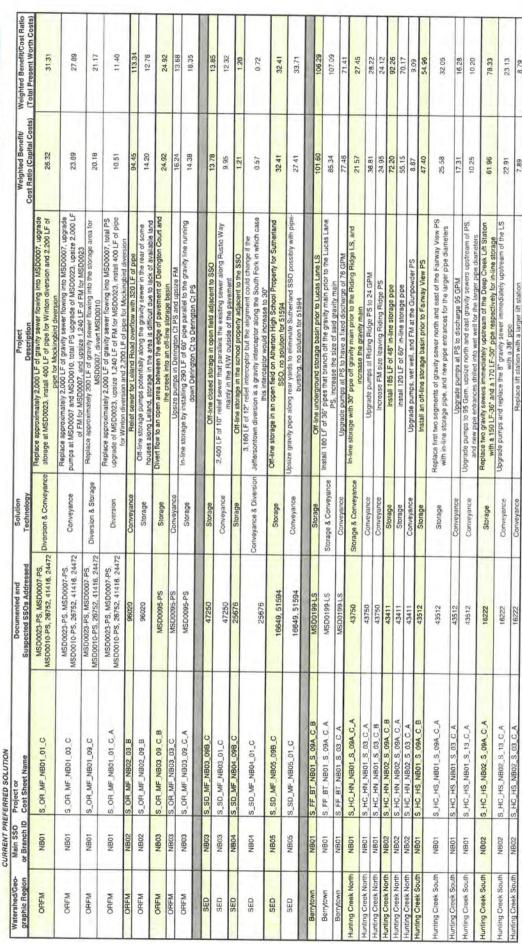




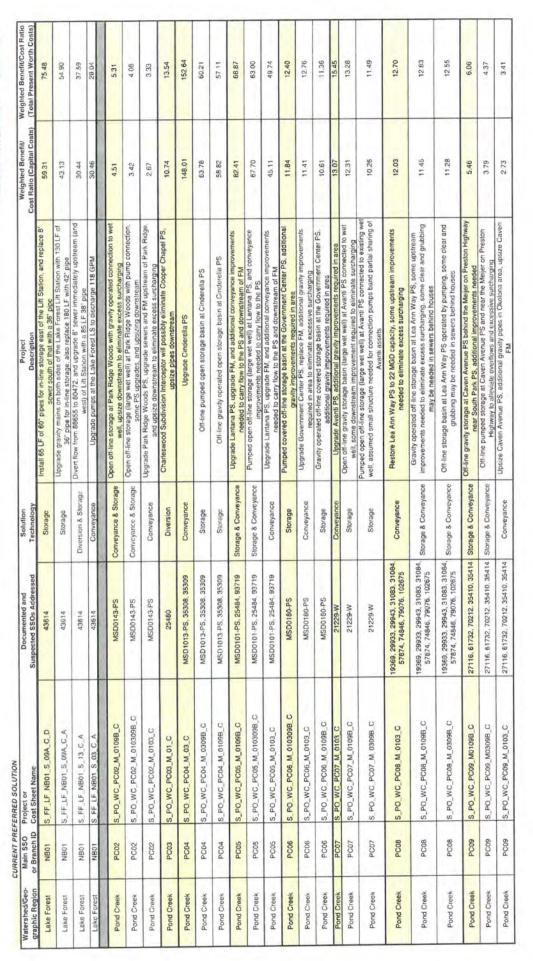




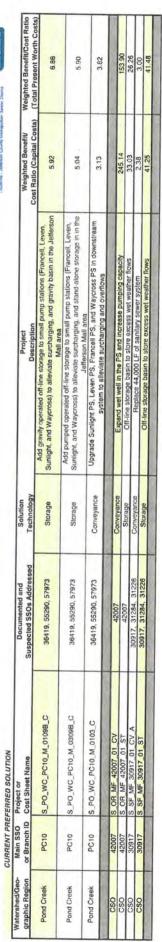












\*\*SSOs eliminated by projects considered part of the baseline conditions are not included in this spreadsheet.

RAFT	DRAFT Middle Fork Network Branch 6 / Floyds Fork Network Branch 1 - SSO Characteristics	twork Bran	ch 6 / Floy	ds Fork	Network	Branch 1 -	SSO Chai	racteristic	S					
OSS OID	SSO NAME	FACILITY TYPE	OVERFLOW	OVERFLOW TYPE	OVERFLOW DISCHARGE TO	RECEIVING	SERVICE AREA	WATERSHED	SERVICE AREA, WATERSHED MODEL REGION	AVG ANNUAL NUMBER OF OVERFLOW OVERFLOW VOLUME INCIDENTS (MG/Y) (NO PER YR)	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.	Morns 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		60.0
								1 CO. S. C.						1
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



### SSO SSDP Modeled Solutions Project Fact Sheet



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	
01100	TOADOIO DI 7 ENG OI SI FS	WOMS FORMALI	bypass	Carchbasin	No Data	

### Project Cost Summary Sheet

O MSD

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

Printed Date: 6/18/2008 Estimate Date: 5/16/2008

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

1,649,000 Totals 6 Estimated Open Cut Sewer Construction Cost Cost Estimate Description

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

45,000 44,827 Totals 69 B Total Additional Costs = 23 # of Properties = Description: Real Estate Costs Description Property Acquisition Misc. Extra Cost Easement Cost

Administration Costs	Multipliers Description			Multiplier
Project of the proj	Administration Costs			4%
Sign	Contingencies			25%
9%   8%   8%   8%   8%   8%   8%   8%	nterest			%9
8%   8%   8%   8%   8%   8%   8%   8%	Miscellaneous			%6
Sign   2%   4%   4%   5%   4%   4%   4%   4%   4	neering & Inspection			%8
Project 20 Year Present Worth Estimate =   S	Design Services			2%
19%   29%   19%	Program Management			4%
1%   Total Multipliers	Planning & Preliminary Design			2%
Total Multipliers = 64%   7312   PROJECT CAPITAL COST ESTIMATE = \$   7888   Project 20 Year Present Worth Estimate = \$	Performance Bond			1%
7312 PROJECT CAPITAL COST ESTIMATE = \$ 7888 Project 20 Year Present Worth Estimate = \$			Total Multipliers =	64%
7888 Project 20 Year Present Worth Estimate = \$		7312	PROJECT CAPITAL COST ESTIMATE =	\$ 2,778,0
	-1	7888	Project 20 Year Present Worth Estimate =	92

Enter the Difference as a negative value in the Misc. Extra Cost row and enter in Economy of Scale Adjustment in the Description. For Economy of Scale when dealing with the facility worksheets for a facility whose size is far to adjust the cost and enter the adjustment in the Misc. Extra Cost. (Professional Engineering greater than the largest available on the curve use the following Economy of Scale equation EXAMPLE: For a BF facility of 500 MGD where 100 is the maximum size on the curve use (98,791,131) 109,489,869 208,281,000 s m = correlation exponent (0 < m < 1) Use 0.6 for all structures udgement to be used for decision to use this adjustment.) C = Cr ( Oc / Or ) ^ m Cr = cost from tool at maximum size for facility cost curve Or = maximum size for facility from cost curve C = \$41,686,164 \* (500 / 100) ^ 0.6 C = cost for design size Oc Difference (C - C500) Oc = design size C500 from Tool

Benefit/Cost Model Cost Data	Cost	Data	W
Capital Cost	69	3,011,144	44
Total Present Worth	69	2.473.517	17

MSD Comments

ENRCCI overwrite by Estimator 8550
PROJECT CAPITAL COST ESTIMATE =
Project 20 Year Present Worth Estimate =
Construction Cost Estimate =

\$ 3,011,144 \$ 2,473,517 \$ 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

# OPEN CUT SEWER CONSTRUCTION VALUE ENTRY SHEET

Project ID: S MI MF NB06 M 01 C A

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

Estimate Date: 5/16/2008 Printed Date: 6/18/2008

Total Cost Per Segment							152,420		25,141						
Juennella nadru P	₩	5	59	49	S	69	43	69	49	69	S	49	69	49	49
Traffic Maintenance Required	₽	×	×	×	×	-	-			-			×	×	H
Clearing and Grubbing	⊩	+	×	×	×	-	×	×	×	×	×		×	×	H
Brownfleids	┢		-								H				t
Maintenance of Flow	₩	T			T										r
Dewatering Required	┢	×	×	×	×			×	×	×	×	×	×	×	r
Sewer in Rock	×	×	×	×	×	×	×	×	×	×	×	×	×	×	T
Small Medium or Large Creek Crossing (S.M. or L)		W	M	M	M			S	S	S	S	M			
Small # of Medium or Existing MH Large Crosk Surface Crosk Surface (S,M, or L)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
# of Diversion Structures	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
# of Manholes	15	0	0	0	0	2	8	0	0	0	0	0	0	2	0
Street Width (ft)	15	0	0	0	0	20	0	0	0	0	0	0	15	20	0
# of Water Services Replaced	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
# of New Inlets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
# of Aband'd Inlets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
# of San. Service Laterals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
**Average Depth (ft)	5	5	5	5	5	5	5	Ġ	5	7	5	5	7	3	0
Length of Pipe out Pipe in of Street (ft)	4,300	10	10	10	10	0	2,500	10	10	10	10	10	550	250	0
Length of Pipe in Size (ft) Street (ft)	1,500	0	0	0	0	400	0	0	0	0	0	0	100	100	0
	80	8	8	80	80	8	8	8	8	10			10	00	0
Segment ID	0057	0057(XS)	0057(XS)	0057(XS)	0057(XS)	00746-1	00746-2	00746(XS)	00746(XS)	00746(XS)	00746(XS)	00746 (MD XS	00746-3	01106	

= Total Length of Open Cut Job = Total Length of Sanitary Sewer in Rock 9,790

Estimated Total Sewer Construction Cost = \$

1,648,835

1,648,835

Total Cost for Construction = \$
Small Job Multiplier =

	0	Cluster Comparison	nparison				
S_MI_MF_NB06_01_C_A	Divert 01106, 00746 and MSD0057	MSD0057					
				Raw	Raw Benefit Score <sup>2,4</sup>	core <sup>2,4</sup>	
	CSO/SSO ID5		Regulatory Performance	Public Health	Asset	Environmental Enhance	Eco-Friendly Solutions
	01106 00746 MSD0057		27 27 0 0 0	00000	N N N O O O O	10 10 00 00 00 00 00	7770000
	Weighting Factor Weighted Benefit Score		360	130	36	120	9-18
	Total Benefit Score Total Capital Cost <sup>3</sup> Total Present Worth Costs <sup>3</sup>	<b>628</b> <b>\$2,224,000</b> <b>\$1,861,000</b>					
Weighted Benefit/Cost Rat	Weighted Benefit/Cost Ratio (Capital Costs) Weighted Benefit/Cost Ratio (Total Present Worth Costs)	28.24					
Notes:  1. Data Input Cells are highlighted in yellow 2. Raw Benefit Scores for Regulatory Performance and 3. Capital and Total Present Worth Costs from the "Proj 4. Formulas are referenced based on existing template 5. Use treatment plant name as ID for CSO/SSO projec	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	Public Health values are from the CSO or SSO Level of Control Benefit Sheets Summary" Page of the Cost Model for the clustered alternative layout, if template is changed make sure to double check referenced cells highlist that require improvements to the treatment plant	ne CSO or SSO L del for the cluster ake sure to doubl the treatment pla	evel of Control E ed alternative e check referenc	Senefit Sheets	ghted in gray	

2-Year			Netw	Network Branch #6	ranch	9# 1					
Value:	Value: Regulatory Performance - SS0s	ry Pe	rform	ance	- 880	S					
	Measure		-	Impact / Frequency	Frequ	nency		Rationale	Meast	Measurement Method	por
Performanc e Measure	SSOS	6 month	1 Year	6 month 1 Year 2 Year 5 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.	ds will be via hydrauli charge.	c models to
Λs	Value	25	16	6	4	-	0		Base	Prop	
uə	01106		BL		PH				16	4	12
nbə	00746	BL			РВ				25	4	21
13	MSD0057-LS		BL		РВ				16	4	12
Note - This	Note - This value sheet calculates the total benefit.	lates the to	otal benefit	it.							
Acronyms AAOV - Ave CSO - Corr	Acronyms AAOV - Average annual overflow volume CSO - Combined sewer overflow	llow volume low		WOS · V WWTPs	Vater quali	WQS · Water quality standards WWTPs · Wastewater treatment plants	nt plants	BL Baseline PR - Proposed	Sub	Subtotal	45

01106 - 2 YR	YR	Network	Network Branch #	9						
Value:	Public Health Enhancement -	Ith Enhar	- icement	SSOs						
	Measure			Release	Release Impact			Rationala	Moseum	Mathed
								- Indicologic	Medaurer	Medsurement Method
Performance Measures	SOSS	Basement Area > 50,000 Flooding Gals or or Park or Blue Park or Blue Line Stream - Line < 50,000 50,000 Gals or >>200,000 Gals or	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 m to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.	Measurement methods will be via hydraulic models to quantify the SSO discharge and the GIS to establish relative distance from designated locations or objects.
Λc	6 Month	25	20	15	10	2	0			
u	1 Year	20	16	42	ď	-		10000	1	0
ər	- Near	L			0	*	0	1,000 GL BL	0	0
b	Z TOBE	0	N	o	9	0	0	2,000 GL BL	0	0 0
9J=	5 Year	10	00	9	4	2	0	5,000 GL BL	0	0
	10 Year	2	4	3	2	1	0	8,000 GL BL	0	
Note - This value shee maximum score of 25.	Note - This value sheet calculates the average benefit over the recurrence imaximum score of 25.	erage benefit over	the recurrence in	itervals. A corre	intervals. A correction calculation is included in order to obtain a	is included in or	rder to obtain a	Average Total Score	core	0
Acronyms CSO - Combined sewer overflow FC - Fecal colform GIS - Geographic information sys	Acronyms CSO - Combined sewer overflow FC - Fecal collform GIS - Geographic information system	BL · Baseline GL · Gallons						Corrected Score	IFE	0

00746 - 2 YR	YR	Network Branch	Branch #	9#							
Value:	Public Health Enhancement -	alth Enhar		SSOs							
	Measure			Release	Release Impact			Rationale	Measur	Measurement Method	ethod
Performance Measures	SOS S	Basement Flooding or Park or Blue- Line Stream > 50,000 Gals or >200,000 Gals	Basement Area > 50,000 Flooding Or Or Or Or Or Stream > Line Stream > Line < 50,000 50,000 Gals Or	Release 50,000 - 99,999 Gals	Release 20,000-49,999 Gals	Release 10,000 - 19,999 Gais	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.	ods will be vie 0 discharge an 5.5.	hydraulic models of the GIS to esignated
٨٥	6 Month	25	20	15	10	Ω	0	10,000 Gal BL	22	0	ın
oua	1 Year	20	16	12	8	4	0	30,000 Gal BL	89	0	8
nb	2 Year	15	12	6	9	3	0	60,000 Gal BL	12	0	12
e).	5 Year	10	8	9	4	2	0	100,000 GL BL	80	4	4
4	10 Year	9	4	60	2	-	0	150,000 GL BL	4	4	0
Note - This value shee maximum score of 25.	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.	verage benefit over	er the recurrence	intervals. A corr	ection calculation	is included in	order to obtain a	Average Total Score	Score		40
Acronyms CSO - Combined s FC - Fecal coliform GIS - Geographic it	Acronyms CSO - Combined sewer overflow FC - Fecal collorm GIS - Geographic information system	BL - Baseline GL - Gallons						Corrected Score	ore		10

Measure   Release   Impact   Impact	MODOLOGIA	MISPONS/-LS - 2 TR	- 1	Network Branch #6	9						
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  6,000 GL - BL  25,000 GL - BL  60,000 GL - BL  700,000 GL - BL  700,000 GL - BL  700,000 GL - BL	Value:	Public Hea	alth Enhar	- nement	SSOs						
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  6,000 GL - BL  25,000 GL - BL  60,000 GL - BL  700,000 GL - BL  700,000 GL - BL  700,000 GL - BL		Measure			Release	a Impact			- incited		
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 6,000 GL - BL 25,000 GL - BL 60,000 GL - BL 700,000 GL - BL 700,000 GL - BL 700,000 GL - BL					3	200			Rationale	Measuremer	nt Method
6,000 GL - BL 0 0 0 25,000 GL - BL 6 0 60,000 GL - BL 8 6 100,000 GL - BL 8 6 100,000 GL - BL 4 4  Average Total Score		\$OSS	Basement Flooding or Park or Blue- Line Stream > 50,000 Gals or			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 to quantify the SSO dischargestablish relative distance frocations or objects.	be via hydraulic model ge and the GIS to om designated
6,000 GL - BL 0 0 0 25,000 GL - BL 6 0 6 0 60,000 GL - BL 8 6 100,000 GL - BL 4 4 4 A A Average Total Score	Á	6 Month	25	20	15	10	22	0		-	
25,000 GL - BL 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	oui	1 Year	20	16	12	oc	4	0	0000		0
25,000 GL - BL	ər	3 Vac.				,			9'000 GL - BL		0
60,000 GL - BL 8 6 100,000 GL - BL 4 4 Average Total Score	nba	Z Tear	0	N	o	9	3	0	25,000 GL - BL		9
100,000 GL - BL  Average Total Score  Corrected Score	- - - -	5 Year	10	8	9	4	2	0	60,000 GL - BL		0
Average Total Score Corrected Score		10 Year	2	4	9	2	-	0	100,000 GL - BL		0
BL - Baseline GL - Gallons	te - This value si iximum score of	heet calculates the avi	erage benefit over	r the recurrence in	ntervals. A corre	ection calculation	is included in or	rder to obtain a	Average Total St	core	2
	SO - Combined s. C - Fecal coliform IS - Geographic ir.	ewer overflow Hormation system	BL - Baseline GL - Gallons						Corrected Sco	ore	9

Value:	Asset Protection	tion											
	Me	Measure				m	Impact			Rationale	Mea	Measurement Method	
		Flood Damage	awage	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	Sommative BMPs care induces spormwitten between any endower teach of flooded areas, while seven is agonation may increase between the peak flows and increase the flooding impacts of nature, managed purchase of highly impacts of nature, managed purchase of highly impacts of nature, and managed purchase of highly impacts of nature, proporties may be a chapper way to reduce flood damage and create green space and buffer zones.		Dainaye models where analable, historic coakernor complaints from MSD Cuclenet Information System, or isotoric observations of fluodi- plone areas combined with the expected trialities impacts of steven- system modifications on storm water flows:	complaints traditions of I
se Measures		Basement Back-ups	Back-ups	Sewer surcharging within 6 feet of ground surface for more than 20% of maniboles	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 loor kvelk are typicaly 1 - 2 feet above ground suffice, and tasement thous are hypically 1 - 10 feet below the first floor. A sever startings of first below ground sufficient in the below ground suffice is highly flowly to cause back-ups in homes with basement service.		Measurement methods will be via hydreule modes to guanthy the hydraulic grade fines companed to ground suffice elevations at markoles.	o quantity the
ormanc	Stoom Franks	/-	1	Most Severe Impact				Least Impact	No Impact				
Ped		•	/	sa .	*		24	-	0	Assumptions	Base Case Score	Alternative Score	Total Score
	6 Month	Most	10	52	20	15	10	49	a		10	vo.	.vi
	1 Year		4	20	91	12	00	¥	0		60	8	0
neucì	2 Year		en	15	(2)	6	90	6	0		9	9	0
Fred	6 Year		2	01	80	9	4	64	0		47	ঘ	0
	10 Year	Least	-	40	49	m	2	+	0		m	a	-
	Not Possible	Not seoq eidi	0	0	0	0	0	0	0		Average		1
fote - This value sheet calculates t	cies. This value aheet calculates the average benefit over the recurrence intervals. A correction calculation is included in order to obtain a maximum acore of 25	age benefit over t	the recurrence	ce intervals. A correc	ction calculation is in	cluded in order to of	btain a maximum so	ore of 25.		2	Total Score		

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		Andread of changes in State	OF LEASE P		PAGE .	to report in hadra	(willing hugha	Charles hather	Chieff outs	Cramer or agreeave amplied of commer francis	Claye y brown napers		q
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Assistation - Otton - Sand Air Emissions -	Confit amount day source Missey - 25 pulment alon	Amunitary (E. o. august and strangery (E. o. august and strangery (E. o. august and strangery ages forefored attent)	Could integral ass saids simming off maximus straighter	Over size was considered.	Cristre describe ado soutre importo y to chistories on scensifi	Seller an Other ou	Chine set shickstreed your South strategy of 10 Cultimeter sociasies why	Intrustration, day and Acade referred, 30 (editories plan	ignopista (magas) gr- hejma etros est hakkas amang	velil temetetti (g. p velil temetetti (g. fibrasja sidritti siss bakkapi attavasja	Sammer and any con-	And the same of the second state of the same of the sa	-
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Someth Posts Impacts (Posts flores)	St. communications	On the related a peak	Mar O's rossus et mais P	Thispark remains the dorse dorse concept produces	Passon resident analysis of the control of the cont	See construction for the see	MAGNICACTOR of Your na seprecial park nations			eld - utilitys - ct - ch	Single adoption in	at the formation of the reason over the reservoir	
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Doerstream Co-	Coverabisari impacts rafer to dottaled as the source of ap- the Call for can take defense	d conditions in the Cine is 7 45% of the total nutries should impact the charact	Phote Books antibriph County for knocks trapping the Culti- hore	encedions in the Cost State books attribute County, National bookings in the Chie Links in International Cost () have been 65% of the ratio America Cost tradition the Cold of Melaco. POCR is of Mela to provid in the ratio tradition by providing injuries.	No Jimo Intel just jest telence lefty ha perried or the rhom k	n County) have been in	Polished renovals will be netrage bads, since the red cumulative.	Polaber mecouls will be removed based on relacions in annual entering bases, since the downstrian repairs in an amount of company.	Services in arresal services in arresal				
Strain Nov For Impacts (Pasi flows)	ernementy tright pose them a sails regime based necreation	s art inten viesed by a untake or impractical	orientare of	labelet writished and almost the house and and the labelet and territories to the labelet and	of series equal and to	100	President modern can and Buildes, and the Water O denote attents flows the	Princkine incluing cast valentia filos palabril factor (rechadas SORGE), and 50 Nictor Dastin (Sol has a hybrade component to effected stream flows sharing setting valents woulds	in for riducial is concorned to				
Strum Flow Impacts (DVT only) that	As beay from As groundwis	A Sinkin the to abundo 18 pamping can extralise	present di disastrant para Elifosi foret aeli benefica	a shisan nak o akasbowyn d a businarigar nic cairintan bate fuoit n a anae. Y Caferro can excitate bios fone web benetical imals.	ovic in a stroate. Afternatively,	other custon).	VEX.THE FOODBLEAD BY CAREF CLARBY TOOL NAS 2. UNING HITCHES DIFF.	Protective models can exercise from stockous sources, and the Water Castle Tool Not in thosis compount to estimate an earn form during amount for exercise revers.	all sources and the ordered's amount favor				
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Value:	Eco-riterialy solutions												
Aspect	9.	*	9	*	7	.0	Scoring	Tung 5				Assumptions	Score Per Aspect
Non-Renewable Energy Consumption	Printery snergy consumption is grater tran- secondary treatment	Primary energy consumption equal to 70, 100% of switerdam preferent	Primepy emergy contampleor regular to 30 75% at teconitary treatment	Pontary yearligh (constraint) or stood in 15- althy of secondary frustriant)	Parties every convergoor again to 0 12% or secondary interent	No energy consumption energy for channing and manifely con-	Ceasing and manufacer not resident no princip consumption	***	444	194	Risk		
Use of Natural Systems	Continuent facilies permanent displaces a acres entrante or Soft- locally available green spale.	Constitution facilities of performancies of September 2.5 performancies of 28 significant principal principal principal performancies of September 2.5 perf	Constructed larman of permanently display (-3 parts website or 10 15) in yearly, as allable given specific	Designation (applica- commenced) depose (i) of the anticode of up to the locate grandess premission spars	Construction (Construction Construction) of green States	Alternative doss foll aste or effect oath of systems wetsom or green speci-	Attended drown to lune tonce systems but without great special	Mutanti systems pay a mice Mutal di systems ani nou a callematre l'archor, colo agricourt peri el retermino facción el cardio estre. Incolor el calles de abbilitora given spaire. endertermi premi polici.	Autoral systems are supplicant port of whereasts function 1.3 across of evitantic evision of 10.2 Miles additional priori space	Alleimann Laft area nation systems 2 - 5 acres of weared prested or 25 5219 additional green space	Agentivo result, in rela- cio ratue system the alegement 5- some of rectand of SVP additional given space		н
Multiple-Use Facilities	Constructed taciness permanently reminds recreatorul opportunity	Constructed lacities sugnificantly implant recreational opportunity	Constructed facilities moderately empara- fechnicates opportunity	Constructed facilities have more impacts on recreational apportunity	Construction temporarily empach recentral opportunity	No inteacts on recruitorial apportunities	Additional ingress account to select the control of	Angmittee has finited positive impact on monthline	Abendance significantly orthonics recruitment occurrences	Abemativa increases excellental opportunies et ama	Attenutive record in multi- use facility		ì
Source Control of subwatershed pollutant loads	- 2. 6	Protestive teachings are considered by 30 - 50%	Politise (vedegs are ecrosed by 10: 37%	End of pay politiking chadrage we increased by 0. 10%.	End of pipe political hadrogs implicits are increasibled but takey higher	End at page technical loadings	Pollutani loadings impaichs am inconsistent, but liably Niveri	Source control imhores powiami cadriga ov 2: 31114	Source control reduces: pollutent leadings by 18. 30%.	Source control neticus politikent tonderga try 30 50%	Source como reducer postan todente by more man Sirs.		-
Non-Obtrusive Construction Techniques	Presidenced that of green Space or Lengther strike startgroup.	Man trystughtas (tokuter, Namatra) in deruginary in derugi	Wdwglead that see nous histing wonday, steel adduce	Localized dast, rease and local strain of process	Minor dust and nesse, traffic lane clessins	No veem con maco	No.	77	44	314	**	14.00	-
Consistent Land Use	Designation or manance tachtees we entablish with meghacothood or land use	Facilities inconsistent with neighborhood or lavid use	Facility characteristics maggled to selece impact on respringling	Facilies have agnificant impact on development develop in land use	Facility has munic umpact on der ungement dematy or und une	No mpact on land upon in advisor of mo- above growns facethan.	Alternative intigation nexting compatitions problem	Attendible renover talen increasient with hegistoricog	Amprilativa sembras. Insperie ración from mográdomos	Attendine entlaccos propeity values til nasphortnost	Attention products an analyzonants that september that the september that the september the september to september the september that september the se		0
Impermeable	Sucrees of experiencial surfaces are aspec	G - Cacres of impermeating	1 - 3 acres of imperivable surfaces are added	up to 1 acre of impermedite surfaces are added	Minor increase in impermisable syrlaces added	No change in impromisable sartice	Minor reduction in impermeable surfaces	Up to 1 wire of impermeable Surfaces romoved	1 - 3 acres of importripation surfactor reticions	3 5 acras of impermosese surfaces removed	2 4 2		а
LEEDS	Y'N	2	2	N.A.	NA.	LEEDS some applicable or LEEDS score and	LEEDS S.(No. 10. 25	LEEDS Cunned	LEEDS SALV	LENDS Good	LEDS Parties		0
tructions: (1.)	) Score each alternative in for this alternative i	Instructions; (1,) Score each alternative for each of the eight aspects of the value. Scores of the total score for this alternative in this value, (2). Shaded area represents "fatal faw".	aspects of the value.		an be positive or regative, depending on the impact of the alternative on the value (2) Total the across for each espect to Alternatives that accer in this area should not be proposed.	ling on the impact of the should not be propose	e alternative on the va	iue. (2.) Total the score	s for each aspect to		Total Rew Score Calculates	Calculment	7
Aspect	Rationale						Measurement Method	ethod			Corrected Score	Boyne	r.
Non-Renewable Energy Consumption		Booking wasons would be especial to be for bonsomers of non-rentwater evicing. Beauting provides provide for high encegy consuming afternatives.	sumpey of non-reniwable price		нама визи (иливе корбинало Авача Вича	entered secondary inagment	Evaluation of primary ameng consumed at the WCWTP p	Season of prinary wants consuming per MS of itse trialist companie to the inverge consumer at the WGWTP per ARS treates	aloc compared to the anerga		e calculated may be mo	Note: The total score calculated may be more then 25. In the instances where this might occur, a default maximum score of 25 will be calculated.	nis might occur, a defai
Use of Natural Systems	Partie al Aystems replace o Options that reduce wellan	эний вушты пойко систоти вий веке сопциать инт не botton каздр, бархол, сотот Орбот в 18 гев, се жеванда алд green states get penalty ports.	n wet wes bottom storage lag:	constructed fraseaten		MRI garden alt. hat normane grade space of various britis.		subjective evaluation and drove typica at grape typica action (a Generalizad subjective evaluation of the Track' of the describer "years" of "step	or elemented. Also victudes are or View				
Multiple-Use Facilities	Ezo frendy tourons pred deco nation based lecrost	opisca i eminda toki bereng anjen iliya saj penjanjukogo popisjanova berena koncera kopusa ogo opisca objek opis Opisca i eminda toki bereng anjen iliya saj penjanjukogo popisjanova ilikusa sekua sucuria i kopusa ogo opisca	or both water based and repairing the way.	uur rechafon. Boaking cano roard be considered restros	i. Boatrg, coroso kiyaking, fishing méorg, svimming an, isould bu spokes restled riparkir receitation.	od pytow the financials of	Sutportive on anation of chil metal of butter ware quickly free power of vegitated road	Supportion on plausions of champus predicted to the equation or spower investment as: insular of bedever was quality, introducing both their or Sociation the polaric extraction than the	sor spanish environment as a sold flow poaks, increased				
Source Control of submatershed pollutant loads	- U u	ceroning policient kolor in the scurse amough behavior modification, proxima replacements por restrient inclusionements	or modification, product repla	or Albertage ma	ingement Bulks that capture postulate fleestly stroubing eric of	mucards, franchy avoiding lens o		Modeled limits sopi poliutati socioto pocioticios de calcoldero tre tre ECE William Charlis. Toto a lei companden lo chroman e valves ar proci program elegatementa.	nd by the BOC Water Challity requirements.				
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Acronyme BGC - Beargrass LEEDS - Leaders	Acronyme BGC - Beargrass Creek LEEDS - Leadership in Energy and Environmental Design	correctal Design		MG - million gallons WCW IP - West Cou	MG - millon gallons WCW IP - West County Wastewaler Treatment Plunt	ri Plant				1			

C) MSD

### Public Information and Outreach (PIO) Program Project WIN



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





### Sets Minimum Expectations for PIO in Overflow Abatement Programs Regulatory Guidance

- 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'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

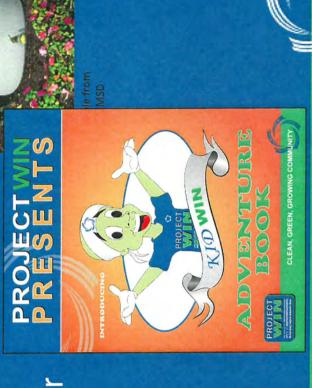






# Role of Ongoing PIO Program Provide Sustainability

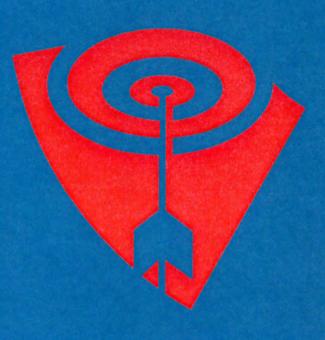
- Promote voluntary participation in private-side I&I control, green infrastructure
- Continue support for financial investment required
- Instill a sense of personal ownership and responsibility for clean water
- Educating children ensures long-term sustainability of voluntary participation





# PIO Program Addresses Several Audiences

- General Public
- **Farget Groups**
- Property OwnersProject NeighborhoodsBuilders
- Restaurants
- Schools/Children







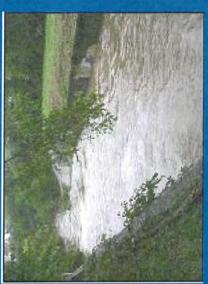
# General Public PIO

# Five Key Messages

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

5







### Tailored for Situation Targeted Groups

### Property Owners

Private property I&I control, green infrastructure participation, etc.

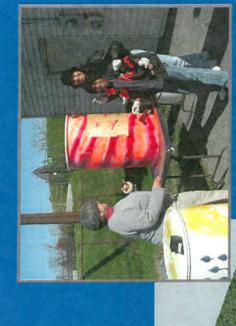
## Project Neighborhoods

- Focused project participation
- Design input"Pardon our dust"
- Project wrap-up and reporting

### Builders

- Low Impact Development
- Restaurants
- Grease control







## 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





### Comprehensive PIO Program Uses Wide Range of Media

AUDIENCE	Public Meetings and Community Events	Web Portal to Project WIV Information	Speaker's Bureau and Technical Support	Print Advertisement, Press Releases	A29 olibei9 bns VT , pabiv VT sildu9	amsigor9 noitingooa9	Targeted brochures, pamphlets, etc.	Reports, Newsletters and Billing Inserts	Demonstration Projects	Direct Wail and Phone Surveys	SwothavO is againgi	Sqorts, Morkshops adones, Workshops
General Public	>	>	>	>	>	>	>	>	>	>	>	>
Homeowners	>	>	>	>	>	>	>	>	>	>		>
Targeted Neighborhoods	>	>	>	>		>	>		>	>		>
Builders		>	>			>	>		>	>		>
Restaurants		>	>				>		>	>		>



We will talk about several of these in more detail



## Public Meetings and Events Cornerstone of MSD's PIO

- Annual Project WIN update neetings
- Progress reportsNext year's activities
- Mayor's Night Out
- State Fair
- Community festivals and events
- Earth Day, Public Health Week
- Clean Sweeps
- Project meetings

   Planning stage
- Close-out reporting

Construction stage







### Provides Detailed Information Enhanced Web Portal

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









### Work Breakdown Structure

### M Honolulu Wastewater

- + Wastewater Treatment Plants
- Wastewater Pump Stations

On Budget

48%

8

- + Wastewater Force Mains
- + Wastewater Collection Systems
  - + Administration
- + Program Management

Completed Projects

Program Management Dashboard

Active Projects

### OSHA INCIDENT VERITY RATE (ISR) YEAR GOAL: 12.13 ACTURL: 11.43 94.2% -ISR-

On Schedule	

On Schedule	85%
• (	23
On Budget	%16
	(9)

Programme	Baseline Current Cost Bdgt Cost	Baseline Current Est.At Cost Bdgt Cost Comp.	Est. At Comp.	Variance	Est. At Baseline Current Comp. Variance Comp. Variance	Current Est. Comp.	Variance
TOTAL PROGRAM	\$4,095M	\$4,095M	\$4,095M \$4,095M \$4,095M	\$0.00M	1 Jan 12	1 Jan 12	0 Days
Wastewater Treatmt.	\$52M	\$52M	\$52M \$52M	\$0.00M	1 Jul 11	130111	0 Days
WW Pump Stations	\$1,312M	\$1,312M \$1,312M \$1,312M	\$1,312M	\$0.00M	1 Aug 09	1 Aug 09	0 Days
<b>WW Force Mains</b>	\$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 \$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

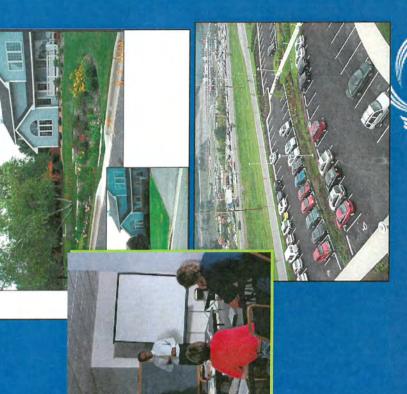
Sustainability

Local intranet



### Adds Technical Support Function Speaker's Bureau

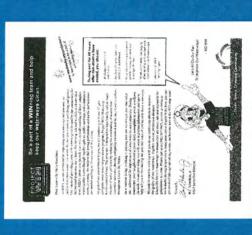
- MSD Vision, Mission, Goals, plans and progress
- Project WIN progress and future activities
- Green Infrastructure
- Rain barrels and rain gardens
- Green roofs
- Pervious pavement, parking lots, drainage





### 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 highimpact notification
  - Metro TV provides opportunities for spot messages and expanded public meeting coverage







# 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







### 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

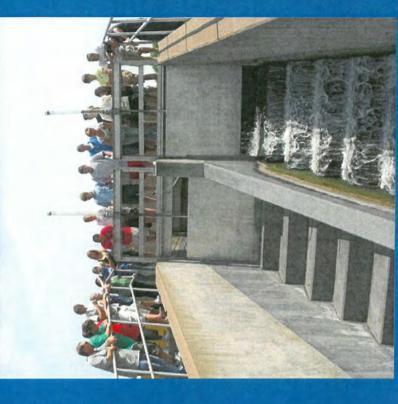






# Tours, Demonstrations, Workshops Appropriate for All Target Audiences

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







# Enhanced School Partnership

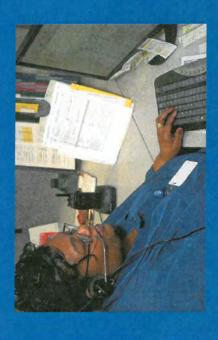
- Continue current programs
  - Expand high-school partnership program
- Each regional plant paired with JCPS high school
  - Plant site provides "environmental laboratory"
- May tie to stream monitoring and restoration programs
  - Expand middle-school activities
- Develop awards program for exemplary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





### Annual Monitoring to Prove Value PIO Effectiveness

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



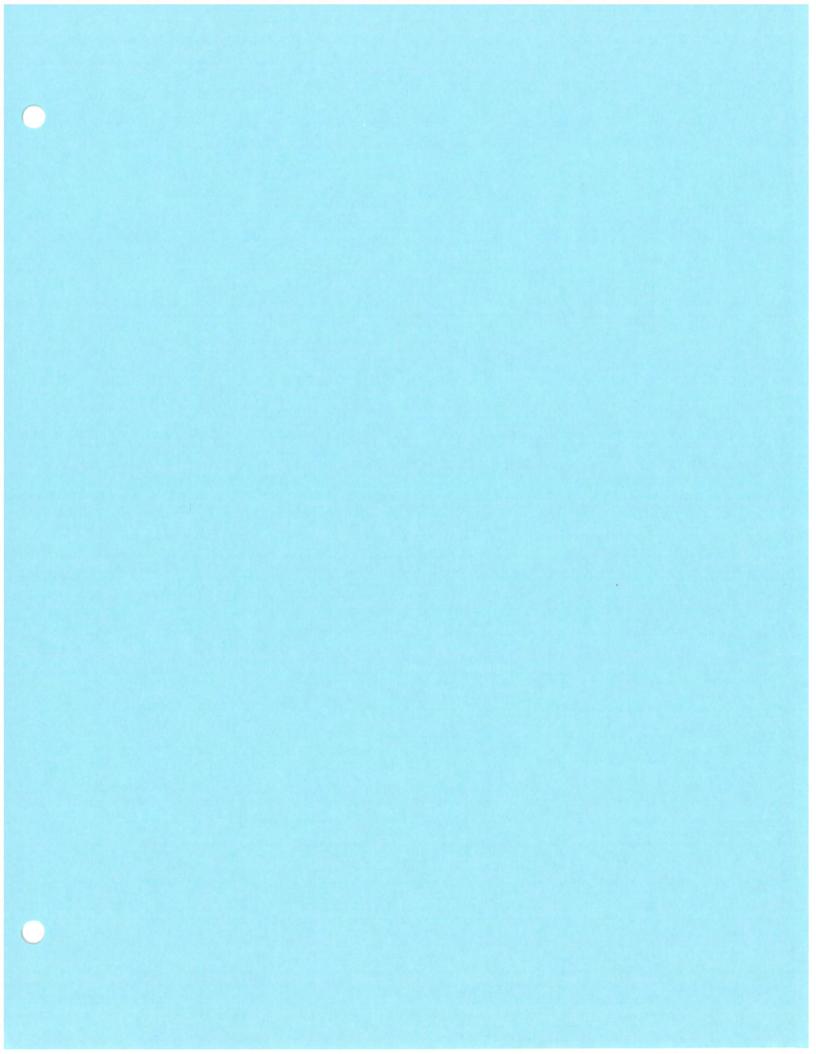


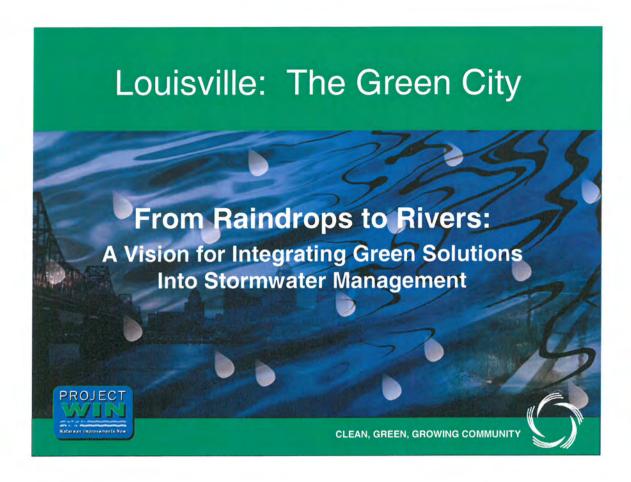


### Discussion Summary Path Forward and





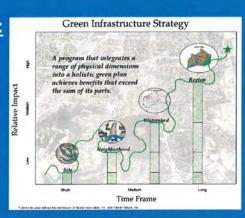




### Green Infrastructure Analysis

### **Analysis at Multiple Scales:**

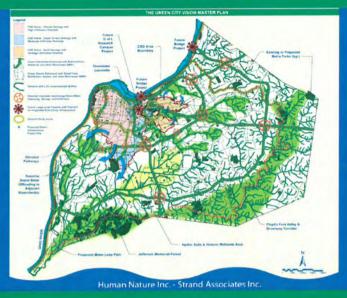
- Metro/County
- CSO Area
- Focus Areas
- Sewersheds
- Projects





CLEAN, GREEN, GROWING COMMUNITY

### Regional Vision



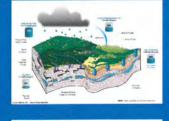
CLEAN, GREEN, GROWING COMMUNITY



### Green Infrastructure Vision Summary - Back to the Future

WATER BALANCE &
THE ANATOMY OF A GREEN CITY









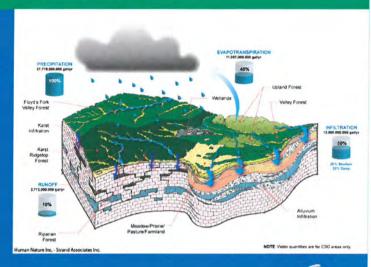


CLEAN, GREEN, GROWING COMMUNITY

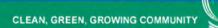


### Green Infrastructure Vision Summary

PRE-SETTLEMENT VEGETATIVE COVER & WATER BALANCE

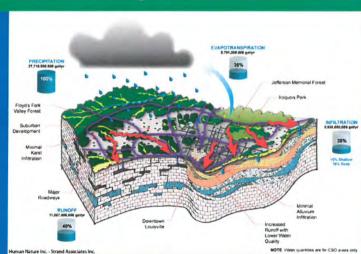






### Green Infrastructure Vision Summary

CURRENT LAND COVER & WATER BALANCE

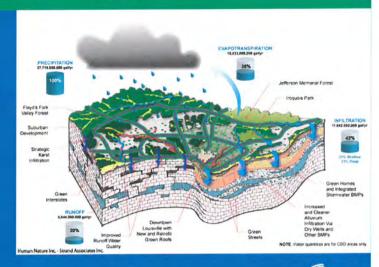






### Green Infrastructure Vision Summary

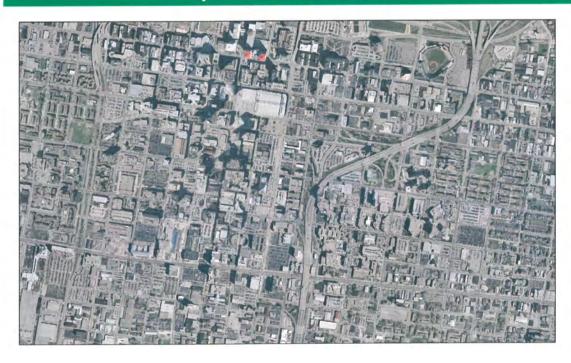
FUTURE LAND COVER & WATER BALANCE







### Impervious Area



### Impervious Area Evaluation

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







# Green Infrastructure Strategies

### PROGRAM COMPONENTS

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





### **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







### **Downspout Disconnect**

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







### Vegetated Roof

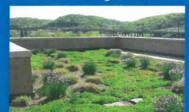
7.4 Million S.F. of public building rooftops (170 acres)

Runoff generated = 160 MG/year

**Considering: Incentive program** 



Pittsburgh, PA



Fort Wright, KY



CLEAN, GREEN, GROWING COMMUNITY

### Vegetated Roof

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



Pittsburgh, PA







CLEAN GREEN GROWING COMMUNITY

### 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







### **Dry Wells**

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

Suggested Program: Identify locations for construction of demonstration projects







### **Urban Reforestation**

**Existing CSS: 11% Tree** 

Canopy

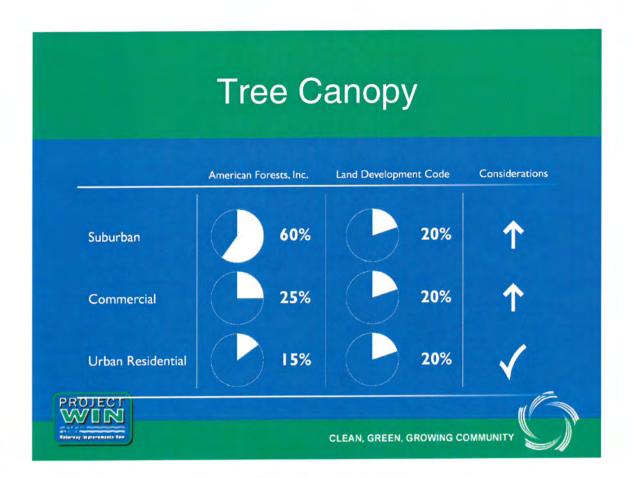
Suggested Program: Increase tree canopy by 15% to provide 53 MG in stormwater reduction

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









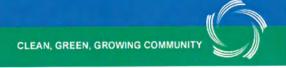
### Green Projects

### Green Alleys

- CSO 015
- CSO 53
- CSO 121

Cost \$11-\$14/ square foot
Drainage areas are site specific





### **Green Projects**

### Green Parking Lots (Biofiltration)

- CSO 53
- CSO 181
- CSO 160

Cost \$10-\$20/square foot





### **Green Projects**

### **Green Streets**

- CSO 121
- CSO 191
- CSO 208

Cost \$5-\$15/square foot





### **Discussion**



