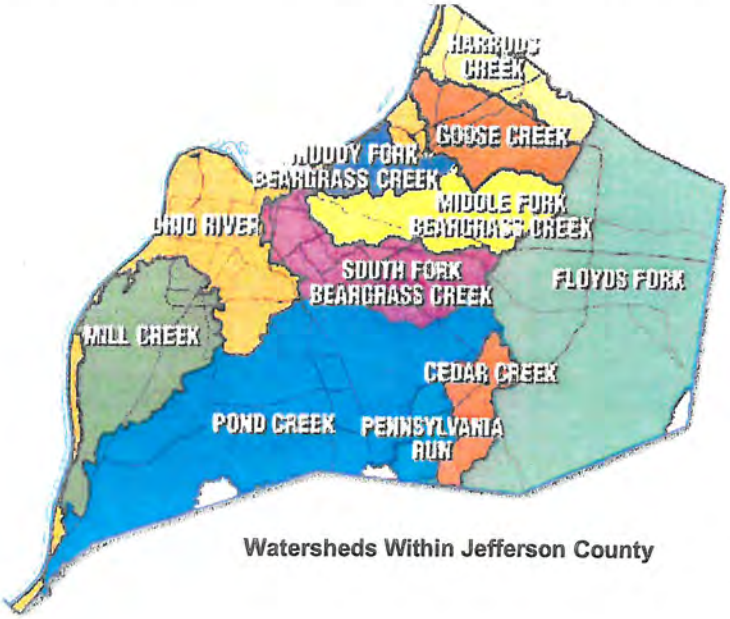
Wet Weather Team Project Meeting Materials

01.05.0231.13

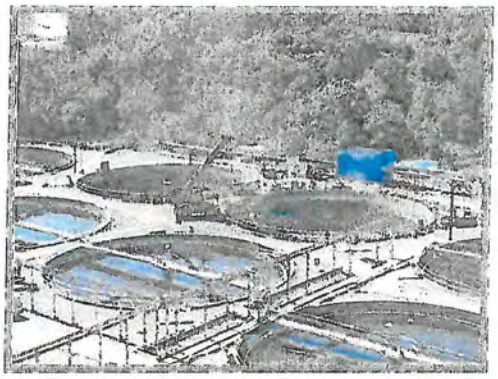
WWT Stakeholders Meeting # 31 11/20/2013

MSD

Louisville and Jefferson County Metropolitan Sewer District



Watersheds Within Jefferson County



Agenda

MSD
Metropolitan Sewer District

PROJECT WIN
Waterway Improvements Now

WWT Stakeholder Group Agenda
November 20, 2013
5:30 p.m. – 7:30 p.m.

5:30 – 5:45 Welcome, Introductions, Meeting Objective, Agenda Review and Stakeholder Meeting "Ground Rules" Review – Angela Akridge, MSD Project WIN Program Manager

5:45 – 6:00 IOAP Design/Construction Update – Steve Emly, MSD Director of Engineering

6:00 – 6:15 IOAP Sewer Rehab Program Update – John Loechle, Infrastructure Manager

6:15 – 6:30 Green Infrastructure Program Update – Wes Sydnor, Sr. Technical Services Engineer

6:30 – 6:40 IOAP Post Construction Compliance Monitoring Program Update – Justin Gray, Sr. Technical Services Engineer

6:40 – 6:50 Cincinnati MSD Recre8 Program Highlight – Gary Swanson, CH2MHill

6:50 – 7:00 IOAP Public Outreach Update – Angela Akridge

7:00 – 7:15 Review of Next Steps – Angela Akridge

- Refining IOAP 2012 Modification with EPA/KDEP Staff
- Continue with IOAP Public Outreach/Project Input Meetings and explore social media engagement/communication/notification options
- Next WWT Stakeholder Group Meeting – Proposed for Spring 2014
- Alternatives to On-Site Stormwater Quality BMPs Workshop Invitation

7:15 – 7:25 Observer Comments

7:25 – 7:30 Wrap-up and Adjourn

Meeting Summary
Wet Weather Team Stakeholder Group Meeting
November 20, 2013
MSD Main Office, Louisville

The Wet Weather Team (WWT) Stakeholder Group, chartered by the Louisville and Jefferson County Metropolitan Sewer District (MSD), met on November 20, 2013, at MSD's main office. The objective of the meeting was to provide a Consent Decree program update to the WWT Stakeholder Group.

Welcome, Introductions, MSD Update and Agenda Review

Greg Heitzman, MSD Executive Director, opened the meeting by welcoming the members and providing a status of MSD initiatives, including:

- LWC and MSD merger seems to be heading towards inter-local agreements (ILAs) in lieu of full merger;
- ILAs looking to reduce the size of rate increases;
- MSD's response to the administrative audit is complete;
- Strategic Business Plan rollout set for January 2014
- Management re-structure being evaluated to better align resources with strategic initiatives and core business functions;
- Retirement and succession planning being addressed with the focus of attracting and building talent;
- The MSD Board is relatively new;
- Good support from the Mayor and good relationship with Metro Council; and,
- Public relations seem to be better overall with fewer negative articles.

MSD Project WIN Program Manager Angela Akridge provided an overview of the agenda, meeting ground rules and meeting objectives.

IOAP Design/Construction Update

MSD Director of Engineering and Chief Engineer Steve Emly gave an update on overall IOAP Implementation progress. The program is approximately 48% complete and 2% below budget when compared to original estimates. MSD is on track to eliminate the remaining small package treatment plants by December 2015, leaving only 5 regional facilities in operation. Refer to the presentation for details. Discussion items included the following:

- Logan Street Storage Basin - depth of the conveyance structure; appearance/use of the building; odor control facilities to be used; and, water surface elevation of the basin proper.
- University of Louisville Downtown Campus – steps necessary to provide permanent relief from inland flooding and University's investment in Green Infrastructure to date.
- Project WIN website update – awaiting final fact sheets from the IOAP modification to update and reactivate the project update section.

IOAP Sewer Rehab Program Update

MSD Infrastructure Manager John Loechle gave an update on this program.

Green Infrastructure Program Update

MSD Director of Engineering and Chief Engineer Steve Emly gave an update on the

IOAP Post Construction Compliance Monitoring Program Update

MSD Director of Engineering and Chief Engineer Steve Emly gave an update on the

Cincinnati MSD Recre8 Program Highlight

MSD Director of Engineering and Chief Engineer Steve Emly gave an update on the

IOAP Public Outreach Update

MSD Director of Engineering and Chief Engineer Steve Emly gave an update on the

Review of Next Steps

MSD Director of Engineering and Chief Engineer Steve Emly gave an update on the

Other Discussion

The following topics were addressed during the open discussion:

- One of the Group members asked if MSD has figured out how many trees will be removed for the IOAP projects and whether or not MSD will be replacing trees in-kind.
    - MSD noted that a large but unquantified number of trees will be removed for the projects and although we are not actively performing reforestation, we are encouraging homeowners to replant trees outside of the MSD easement. MSD does have a few initiatives underway aimed at leveraging MSD funds into other on-going initiatives to help increase community wide tree planting and care-taking of trees.
- MSD provided an update of the Story Avenue/Butchertown CSO 130 Green Infrastructure project stating that members of the EPA Office of Research and development will be in town during March. Their objective will be to collect functional data on green control installations. MSD will be installing interpretive signage within the project area to inform the community on the purpose of the work completed.

Wrap Up and Next Steps

- MSD will contact WWT Stakeholder Group members who were unable to attend.

Meeting Materials

- Agenda for the 1/30/13 WWT Stakeholder Group Meeting
- Copy of the Illicit Connection and Water Quality program update slides
- Proposed WWT Stakeholder Group Statement of Support Memo for the IOAP 2012 Modification

Meeting Participants

Wet Weather Team Stakeholders (Present)

Stuart Benson, Louisville Metro Council, District 20
Arnita Gadson, Executive Director, Kentucky Environmental Quality Commission
Kurt Mason, District Conservationist, Jefferson County Soil Conservation District
David Tollerud, University of Louisville School of Public Health and Information Sciences
Tom Herman, Zeon Chemicals
Bob Marrett, CMB Development Company
Lisa Santos, Irish Hill Neighborhood Association

Wet Weather Team Stakeholders (Not Present)

Steve Barger, Labor (Retired)
Susan Barto, Mayor of Lyndon
Allan Dittmer, University of Louisville Provost Office
Mike Heitz, Director, Louisville Metro Parks
Rick Johnstone, Deputy Mayor, Louisville Metro Mayor's Office (Retired)
Jim Mims, Louisville Metro Planning & Design Services Department
Tina Ward-Pugh, Louisville Metro Council, District 9
Bruce Scott, Kentucky Waterways Alliance
David Wicks, Kentucky Conservation Committee, Jefferson County Public Schools Center for Environmental Education (retired),

Wet Weather Team MSD Personnel (present)

Angela Akridge, MSD Regulatory Policy Manager
Brian Bingham, MSD Regulatory Services Director
Greg Heitzman, MSD Interim Executive Director
Steve Emly, MSD Director of Engineering and Chief Engineer

Technical Support

Gary Swanson, CH2M HILL

Meeting Observers

Clay Kelly, Strand Associates
Teena Halbig, Floyds Fork Environmental Association
Justin Gray, MSD
John Loechle, MSD
Wes Sydnor, MSD

Handouts

MEMORANDUM

TO: Louisville and Jefferson County Metropolitan Sewer District Board

FROM: Stakeholder Members of the Wet Weather Team

DATE: January 30, 2013

SUBJECT: Draft Integrated Overflow Abatement Plan 2012 Modifications

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As stakeholder members of MSD's Wet Weather Team (WWT), we wish to indicate our support for the Final Integrated Overflow Abatement Plan (IOAP) 2012 Modifications as MSD transmits the plan modifications to the U.S. Environmental Protection Agency (EPA) and the Kentucky Environmental and Public Protection Cabinet. The attached documents, "Vision for MSD's Integrated Overflow Abatement Plan," and "2012 IOAP Project Modifications" summarize the Wet Weather Team's common understanding of the high-level architecture and components of the IOAP and the proposed 2012 Modification. As stakeholder members of the WWT, we played an active role in developing the IOAP Vision and are pleased to see that the principles of this Vision have been retained in the 2012 Modification Our support for the IOAP and the 2012 Modification is based on the expectation that the complete plan is fully reflective of and consistent with the IOAP Vision and the 2012 IOAP Project Modifications documents attached. We support this vision for improving wet weather sewer overflow management in our community. In this memorandum, we review the composition and charge of the Wet Weather Team, describe the results of the stakeholder subgroup's deliberations, and outline our support for the IOAP.

Wet Weather Team Composition and Charge

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

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

Results of the Wet Weather Team's Deliberations

The Wet Weather Team met 22 times from July 2006 through December 2008 and provided input on all major components of the IOAP, as well as the analytic framework and the public involvement process

MSD used to develop the IOAP. The WWT also met to review the public comments submitted on the Draft IOAP and discuss the changes proposed for the Final IOAP. There are four areas of the WWT stakeholder subgroup's deliberations that we would like to highlight, as follows.

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

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

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

4. Summary of IOAP Projects: We believe the project mix and outcomes that form the backbone of the IOAP (as captured in the attached IOAP Vision) reflect responsiveness to MSD's consent decree and provide for a critical, first increment of water quality improvement for our community, while ensuring wise and effective use of our community's resources. The IOAP Vision draws on front end consideration of and investment in green infrastructure and other source control approaches, including "private side" inflow and infiltration (I&I) control. These early investments will act to test and demonstrate the effectiveness of these approaches, creating the prospect, based on demonstrated performance, for expanding their role and lowering community costs as MSD implements the IOAP. We understand that MSD, consistent with the Post-Construction Compliance Monitoring Plan, will closely monitor and report on the efforts for both regulatory and public education purposes. We further understand that MSD, over the

coming months, will work with community members to further articulate and enhance the scope and scale of its IOAP public education and outreach program, including developing a robust approach for measuring the effectiveness of the program.

After IOAP approval in September 2009, the WWT Stakeholder Group continued to meet twice per year for progress reports and updates. When the need for the 2012 IOAP Modifications became apparent, MSD invited the original members of the WWT Stakeholder Group to continue to serve as a sounding board, ensuring the modifications to the plan and specific project designs remain true to values, priorities and financial plan that was originally developed. Most of the original members chose to continue their active participation in the process.

As MSD moves forward in coming years with IOAP implementation, we do anticipate the program will face, as all programs of this type do, project-specific challenges related to local community understanding and acceptance. In this context, we understand MSD is committed to using focused and sustained neighborhood education and outreach efforts to support project-specific and overall program implementation and will strive to address localized needs consistent with overall IOAP requirements. At the same time, we believe all localities throughout the MSD system must keep in mind that individual IOAP project locations and types have emerged from a rigorous and consistently applied technical analysis that has been continued through the 2012 IOAP Modifications. The IOAP projects exist as critical building blocks for an overall community program framed by federal and state regulatory requirements, community water quality and public health improvement objectives, and overall rate payer capacity.

The stakeholder subgroup of the Wet Weather Team appreciates the opportunity to have contributed to MSD's IOAP development efforts. During our meeting on December 4, 2008, we discussed the importance of an overarching, sustained community water quality education initiative directed at enhancing appreciation for water quality improvements and building understanding of the actions all members of the community can take to improve water quality. We understand this effort is substantially broader in scope than the CSO and SSO improvements addressed by the IOAP, but we believe it is important to take this opportunity to raise awareness for this need, particularly as our community turns its attention to stormwater management in the context of the multi-jurisdictional Municipal Separate Storm Sewer System (MS4) permit. We appreciate MSD's willingness to be a contributor to such an effort, even as we recognize the need for broader involvement and leadership throughout the Louisville community and across Louisville Metro Government.

We look forward to the MSD Board's review of the 2012 IOAP Modifications and MSD's submittal of the 2012 IOAP Modifications to EPA and the State of Kentucky. Thank you for the opportunity to contribute to this critical community improvement initiative. Please feel free to contact us individually or collectively with any questions or perspectives you may have.

Unanimously Adopted at the January 30, 2013 WWT Meeting
Stakeholder Members of the Wet Weather Team

Member	Organization*
Steve Barger	Labor (retired)
Susan Barto	Mayor of Lyndon
Stuart Benson	Louisville Metro Council, District 20
Jim Mims	Louisville Metro Planning & Design Services
Allan Dittmer	University of Louisville
Arnita Gadson	Kentucky Environmental Quality Commission
Mike Heitz	Louisville Metro Parks Department
Tom Herman	Zeon Chemicals
Rick Johnstone	Deputy Mayor, Louisville Metro Mayor's Office (retired)
Bob Marrett	CMB Development Company, LLC
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 (retired)

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

WWT Stakeholder Agenda

- Welcome (5:30)
- IOAP Design/Construction Update
- IOAP Sewer Rehab Program Update
- Green Infrastructure Program Update
- IOAP Post Construction Compliance Update
- Cincinnati MSD Recre8 Program Highlight
- IOAP Public Outreach Program Update
- Review of Next Steps
- Observer Comments
- Adjourn (7:30)

PROJECT WIN Waterway Improvements Now

MSD

PROJECT WIN Waterway Improvements Now

IOAP Design/Construction Update

Overflow Abatement Project Suite

- Pipeline projects
- Storage basins
- Pump station expansions
- Wastewater treatment plant expansions
- Green infrastructure
- Downspout disconnections
- Sump pump disconnections
- Sewer rehabilitation

Implementation Progress - 2007 thru 2013

Gray Infrastructure Projects (78)

- 25 completed
- 26 in design/construction

Green Infrastructure Projects

- 48 completed
- 49 in design/construction

Source Control Projects

- 16 projects completed
- 13 projects in design/construction

Overall Program Completion

- 48% complete
- 2% under budget, compared to original estimates

Beechwood Village - Pumped Overflows Eliminated

Beechwood Village
Pumped and Gravity Overflows
Overflow closed 09/29/2010

Highgate Springs Pump Station Elimination

Highgate Springs
Pumped Overflows
Overflow closed 11/29/2012

PROJECT WIN

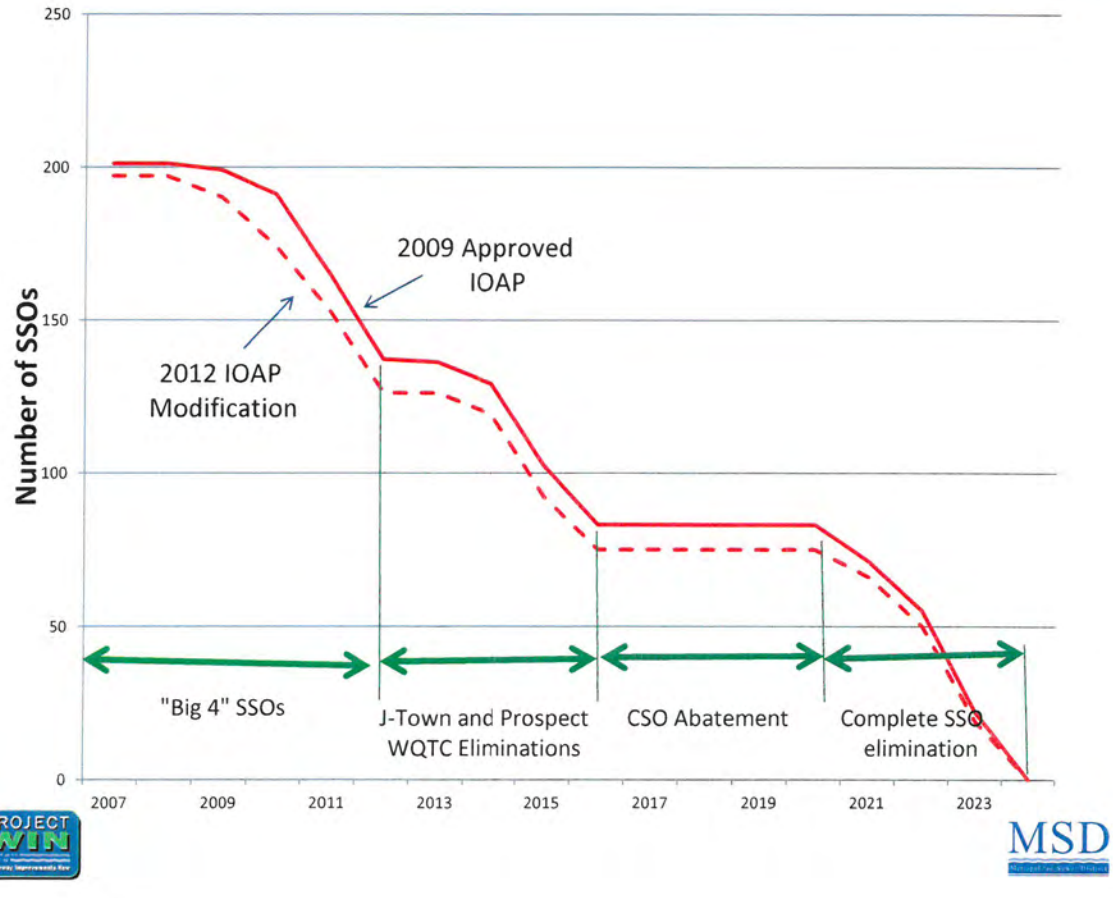
MSD

Hikes Lane Interceptor Construction

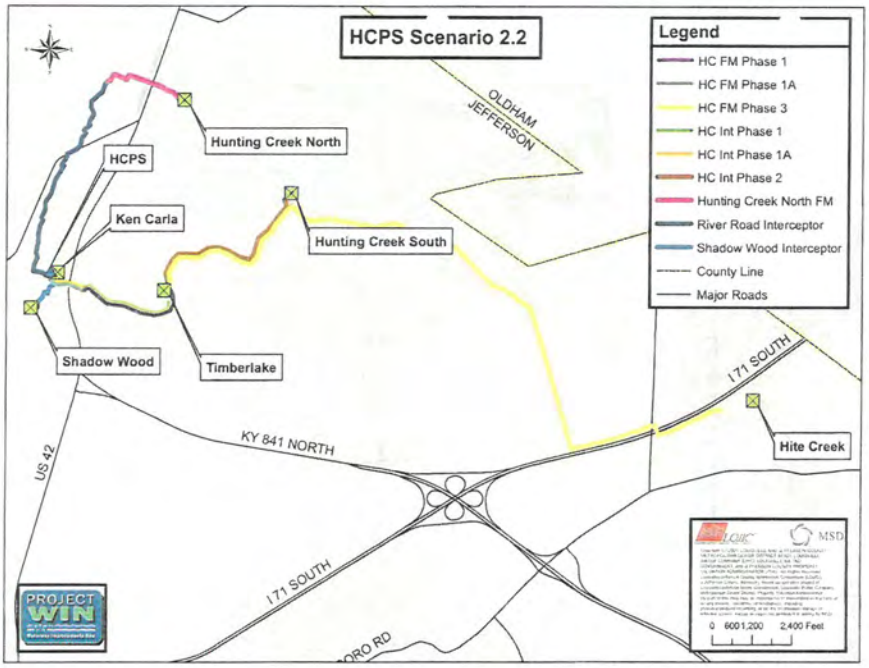
Hikes Point

Pumped Overflows

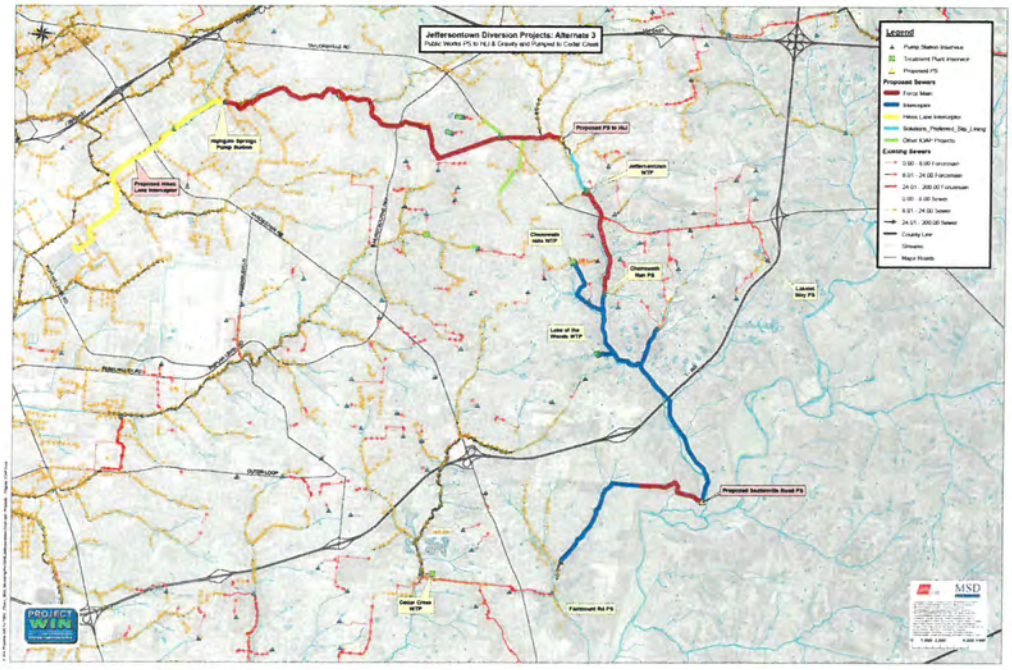
Overflow closed 11/29/2012



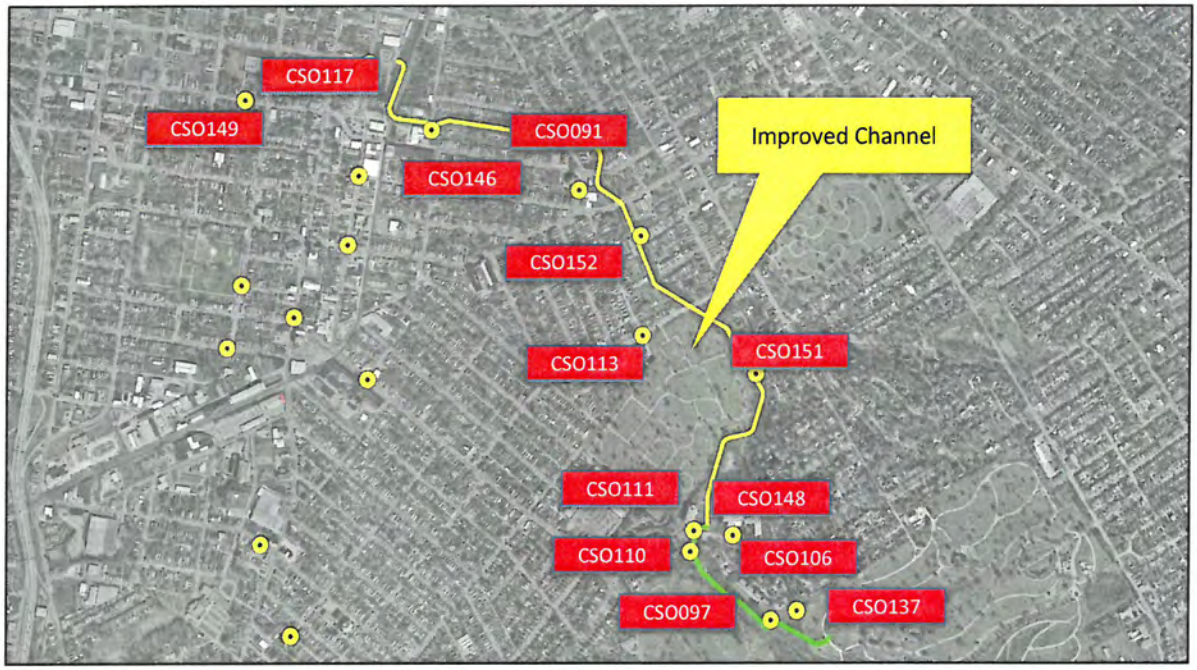
(5) Prospect WTP Eliminations



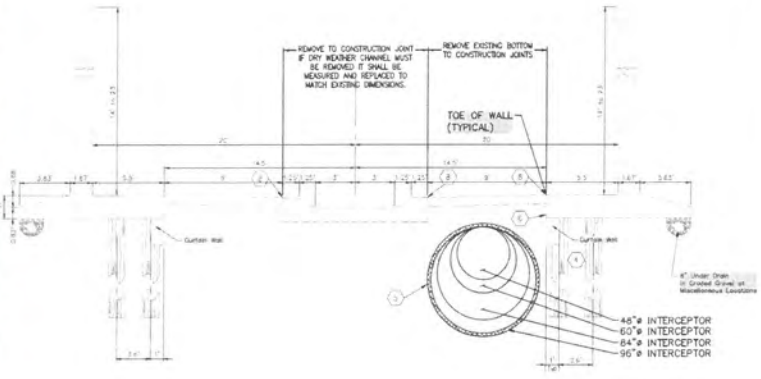
Jeffersontown WQTC Elimination



Logan Street CSO Basin



Logan Street CSO Basin



Remaining package plants

All out of service by end of 2015

FY14 – FY18 Capital Highlights

- Elimination of (5) Prospect WTP's (CD)
- Elimination of Jeffersontown WTP (CD)
- Maple Street buyouts
- Continuation of Project DRI
- Rehabilitation of Paddy's Run FPS
- System upgrades to multiple other FPS
- Large investment in Green Infrastructure (CD)
- Large investment in sewer rehabilitation (CD)
- Early CSO Basins will move into construction (CD)
- Certification of Flood Protection System
- Elimination of all MSD-owned package treatment plants
- Compliance with new MS4 Permit

PROJECT WIN
Waterway Improvements Now

IOAP Sewer Rehab Program Update

Rehab Project Since 2010

- Beargrass Interceptor
- Floydsburg
- Parkview
- Hazelwood
- Sonne
- Edsel
- Shadow Wood
- Lantana
- Hurstbourne
- Saint Matthews Interceptor
- Lea Ann Way Interceptor
- FY12 Annual I&I Rehab
- Fern Creek
- Fegenbush
- FY13 Annual I&I Rehab
- Lake Forest
- Prospect
- Meadow Stream
- Cavin
- Camp Taylor Prestonia
- FY14 Annual I&I Rehab

Rehab Activities Totals

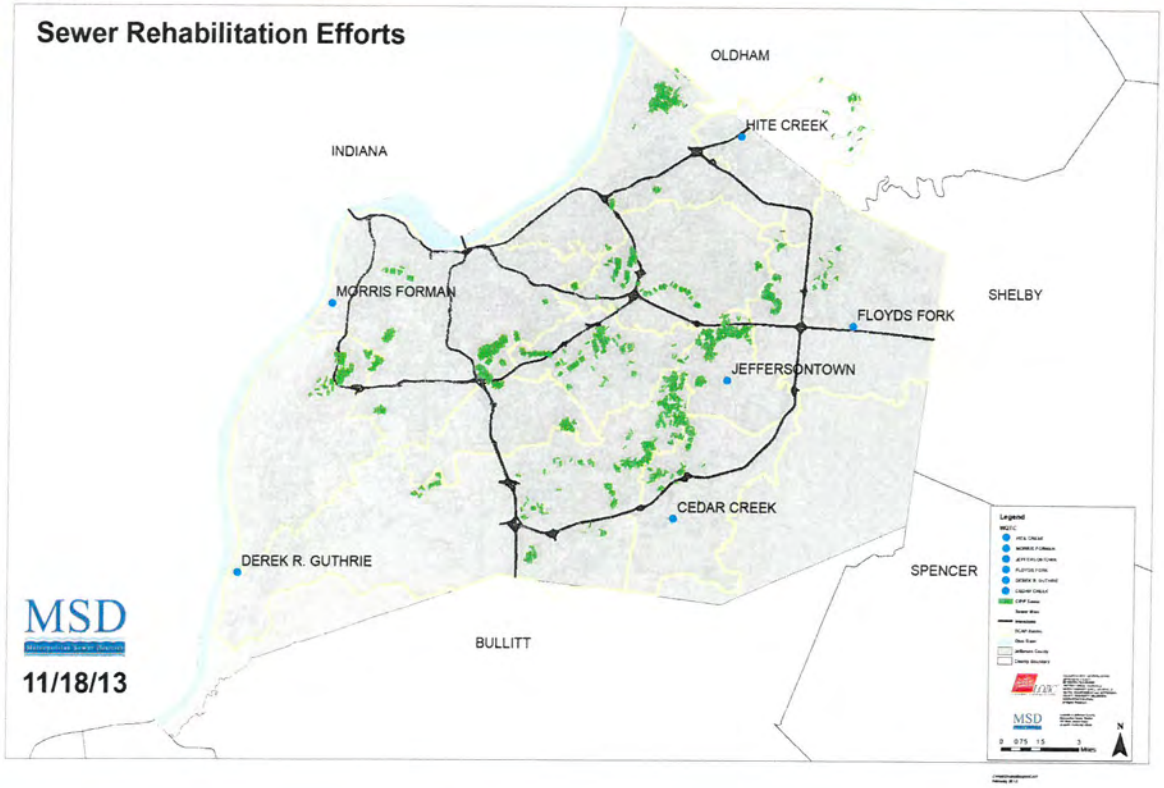
Activity	Total	Units
CIPP	144,767	LF
Later Tophats	1,835	EA
Point Repairs	1,453	LF
Clean and Inspect	89,906	LF
Chimney Seals	980	EA
Epoxy Coating	494	EA
Frame and Lid	228	EA
Water Tight Frrame and Lid	409	EA
Realign Frame and Lid	254	EA
Locate and Raise	436	EA
Clean and Inspect	199	EA
Total Rehab Cost	**$ 16,528,000.00**	
SCAP Credits (gpd)	**5,215,000**	
Ratio	**3.17**	

Sewer and Manhole Rehab

Activity	Total	Units
Sewers Rehabed	236,126 (45)	Feet (miles) of Pipe
Laterals Rehabed	1,835	Laterals
Manholes Rehabed	2,999	Manholes
Total Rehab Cost	**$ 16,528,000**	
SCAP Credits (gpd)	**5,215,000**	
Treatment Cost Saved	**$419,000/YR**	

Over 45 miles of sewer pipe rehabbed!

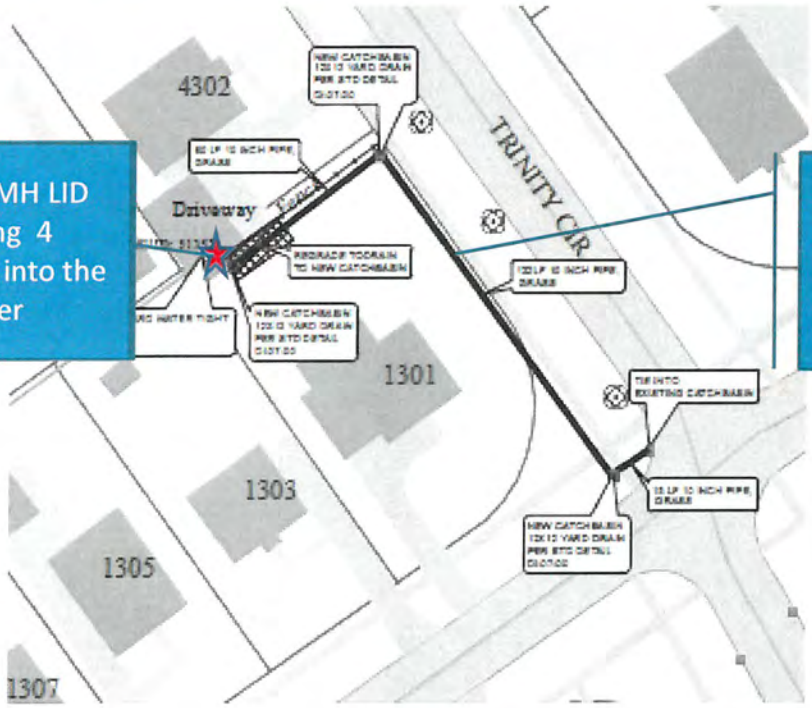
Sewer Rehabilitation Efforts



Putting the Creek Back in the Creek

Storm Flow Returned to Storm System

VENTED MH LID draining 4 properties into the Sewer



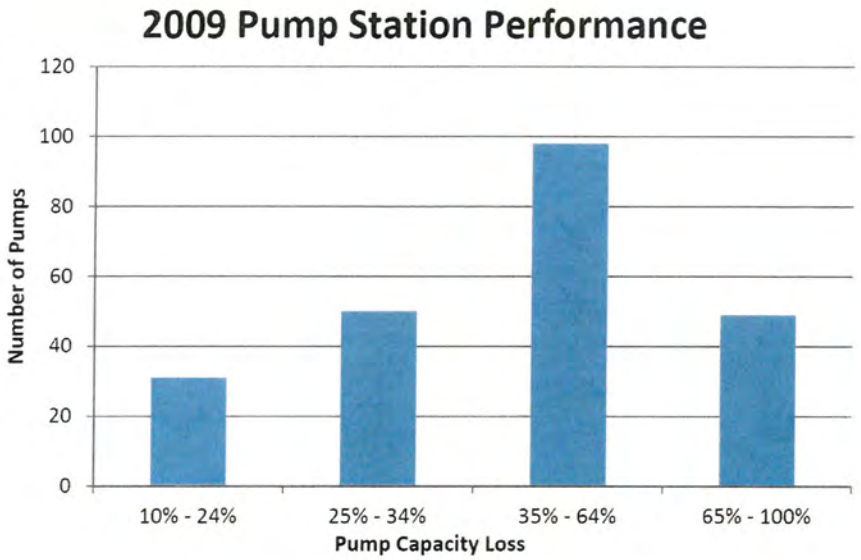
New Storm sewer redirecting surface flow to Storm System

Pump Station Rehabilitation Efforts Since 2010

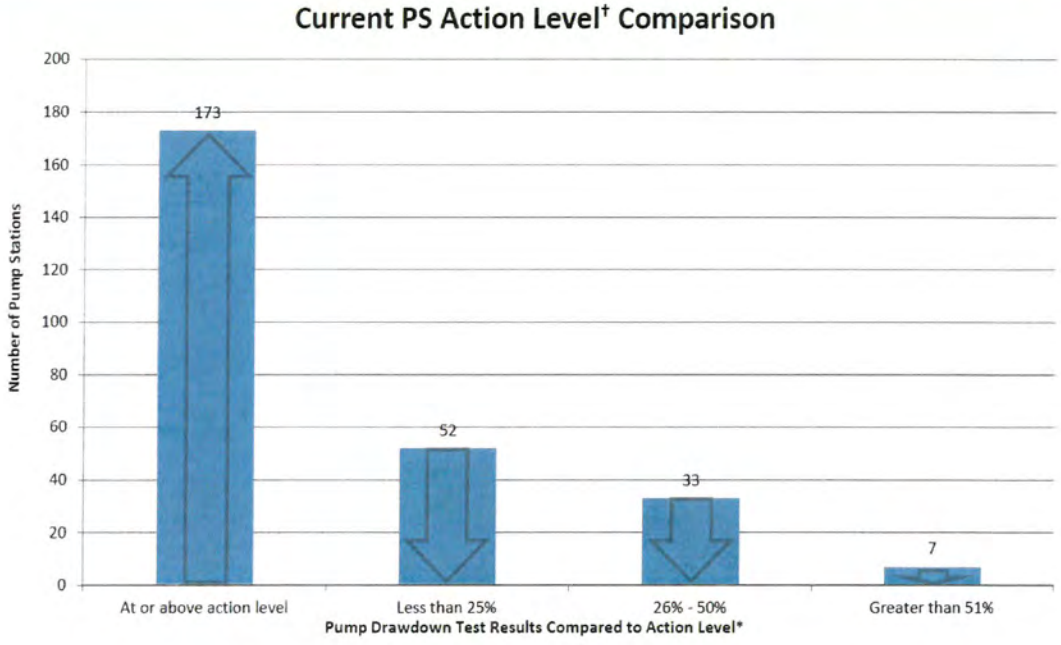
	Count	Cost
Pump Replacement	36	$357,387
Valve Replacement	8	$30,582
Pump and Valve Replacement	3	$29,461
Electrical Work	22	$84,563
Generator Installation	39	$1,440,655
Generator Repair	9	$11,523
Pump Repair	8	$80,554
Access Road	3	$72,806
Miscellaneous	26	$161,504
	142	$2,629,035

65% Done w/ In-House Resources

2009 Pump Station Performance



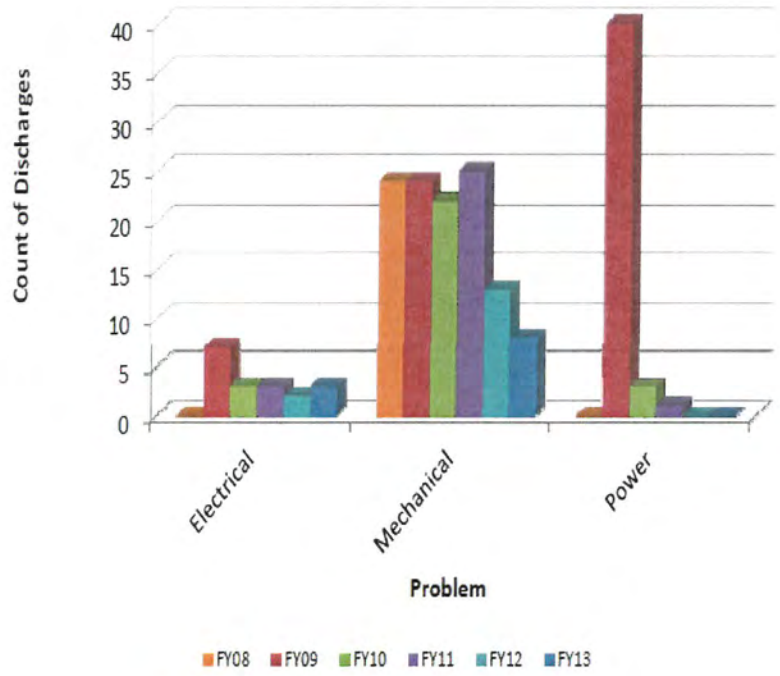
Current PS Action Level Comparison



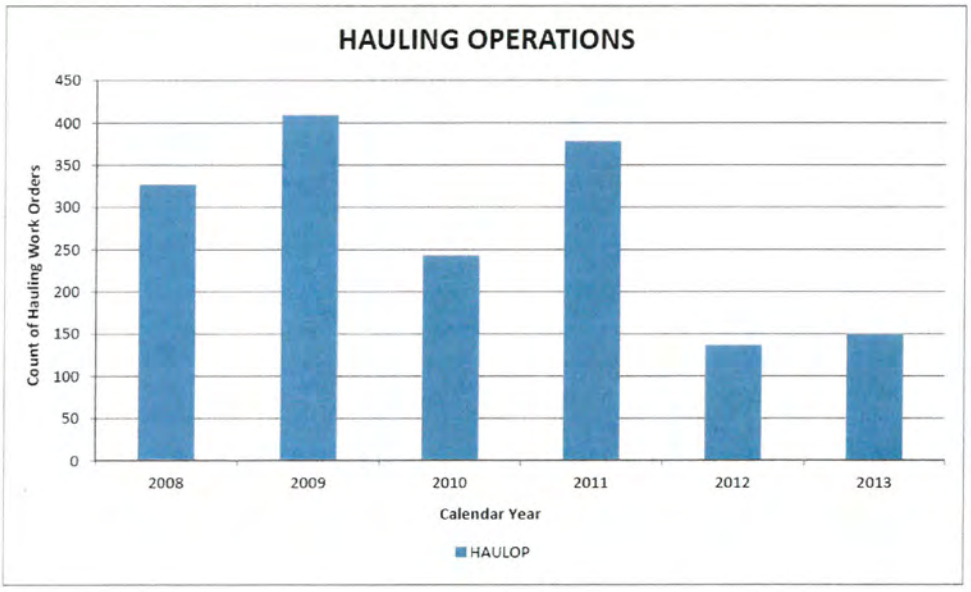
* In some cases where draw down data was not available, the design capacity was used to calculate performance

† Action level is the minimum pump capacity required to handle the peak influent flow rate to the pump station

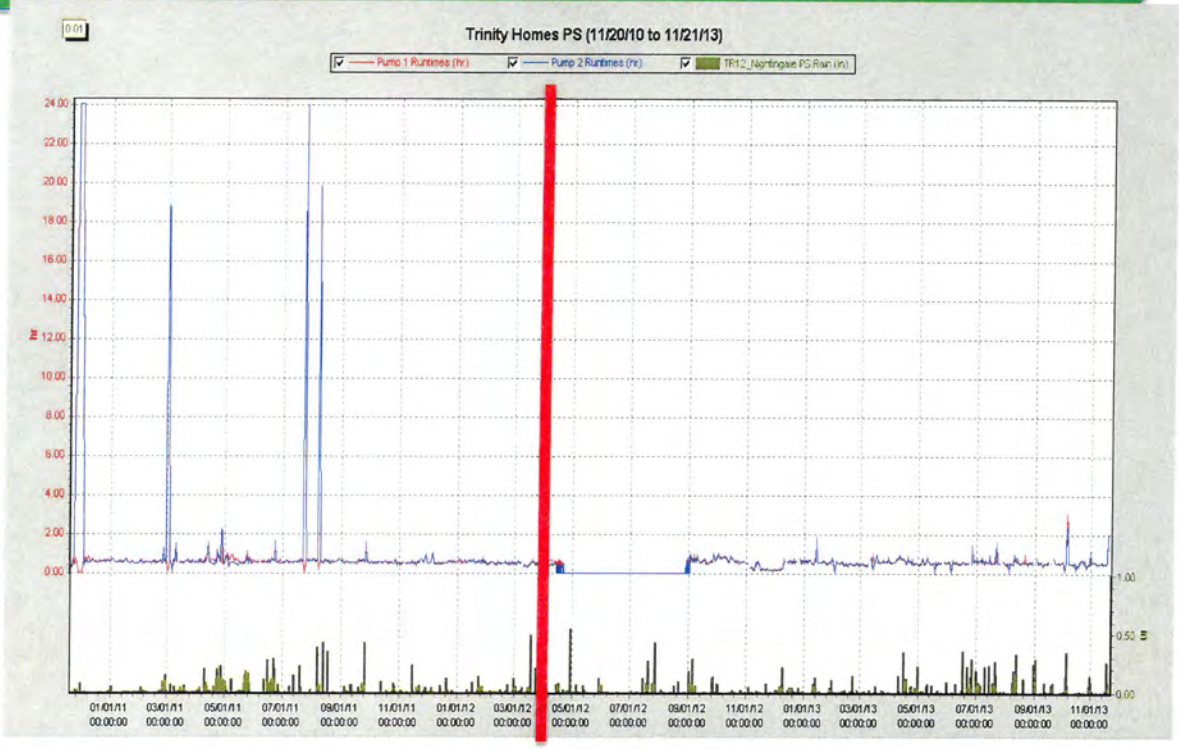
Dry Weather SSOs by Problem Code (Includes INT, EXT & WUS)



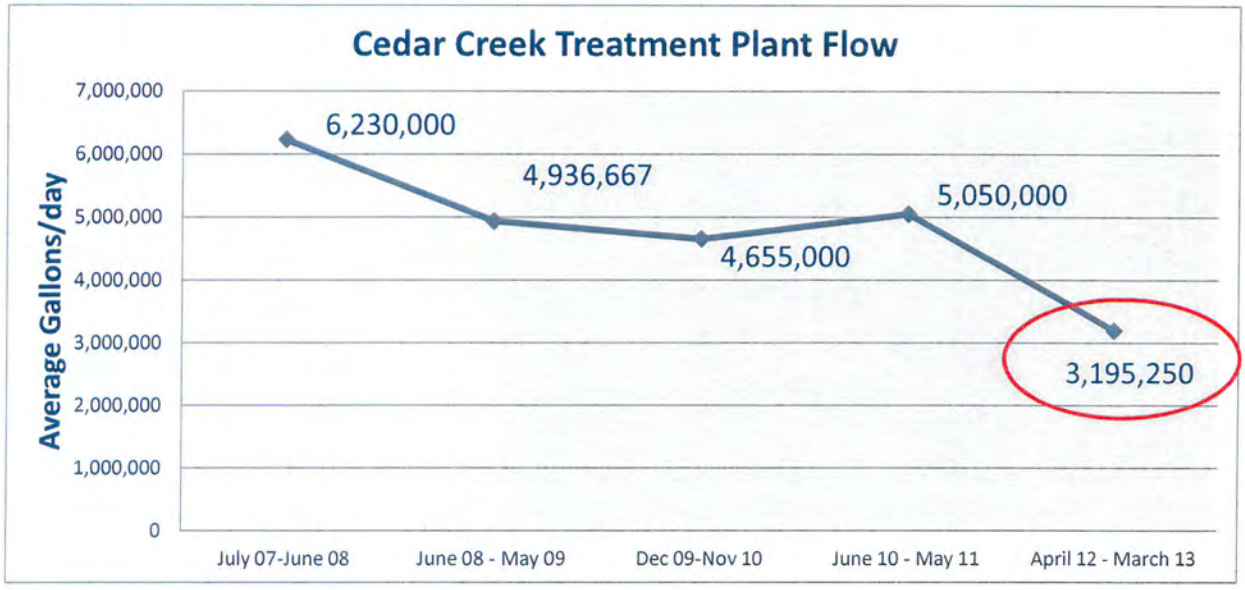
MSD Hauling Trends over a 6 Year Window



Pump Station Run Time Less Sensitive to Rain Events



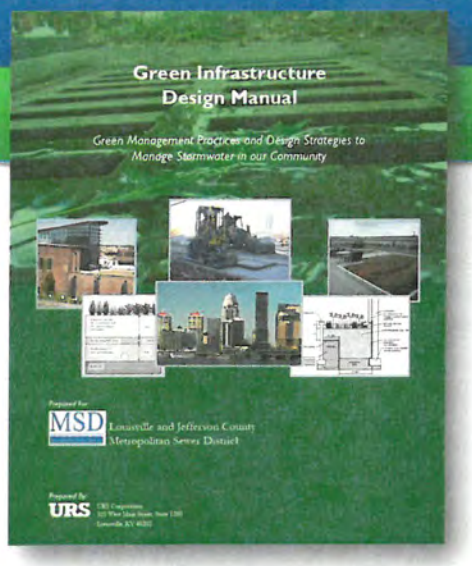
Rehab Performance Results



Flow Reduction of almost 2 million gallons per day

PROJECT WIN
Waterway Improvements Now

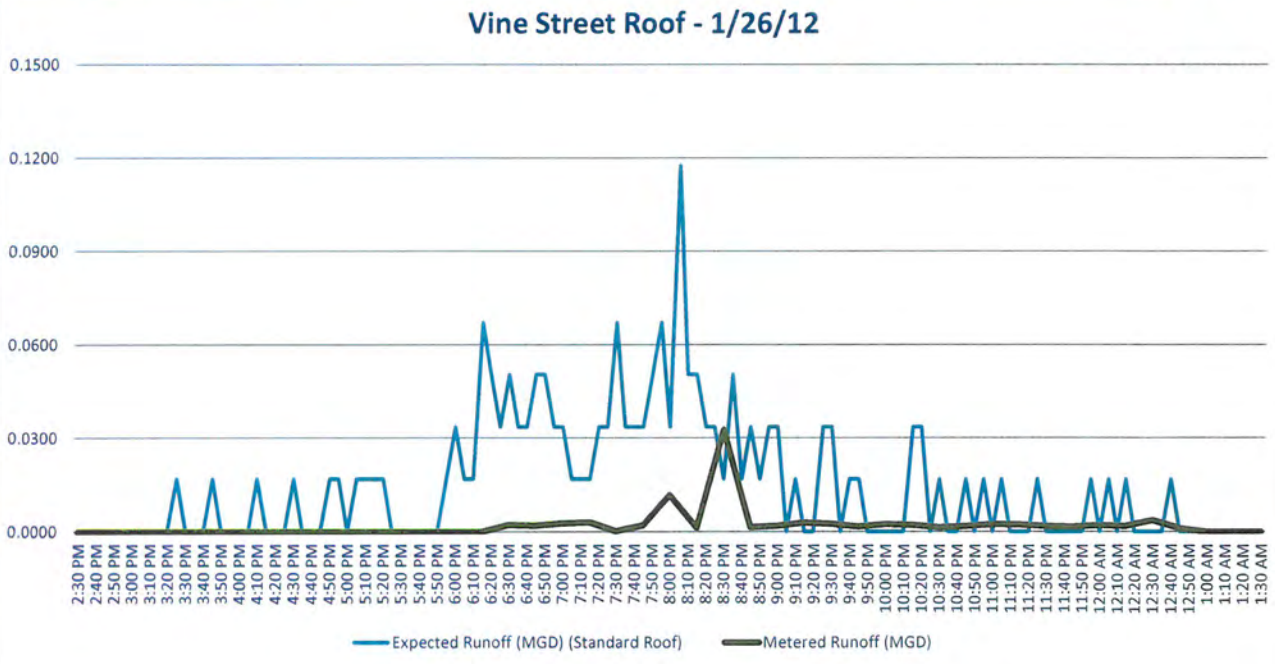
Green Infrastructure Program Update



GREEN INFRASTRUCTURE DEMONSTRATION PROJECTS

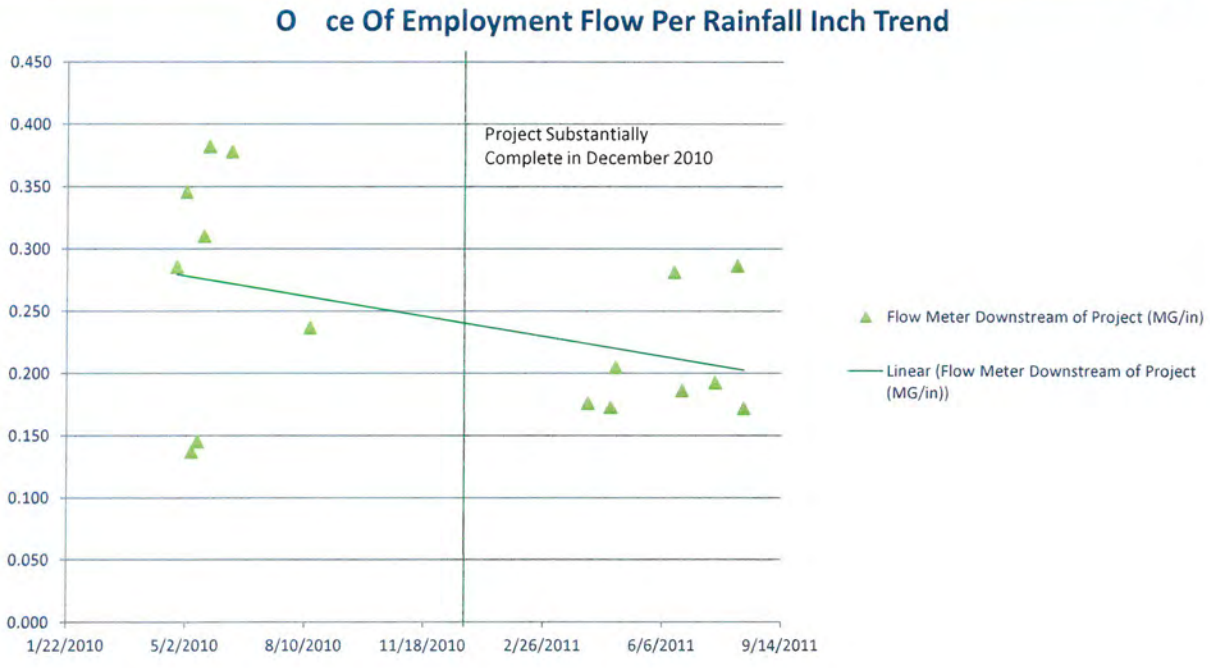
Vine Street Case Study

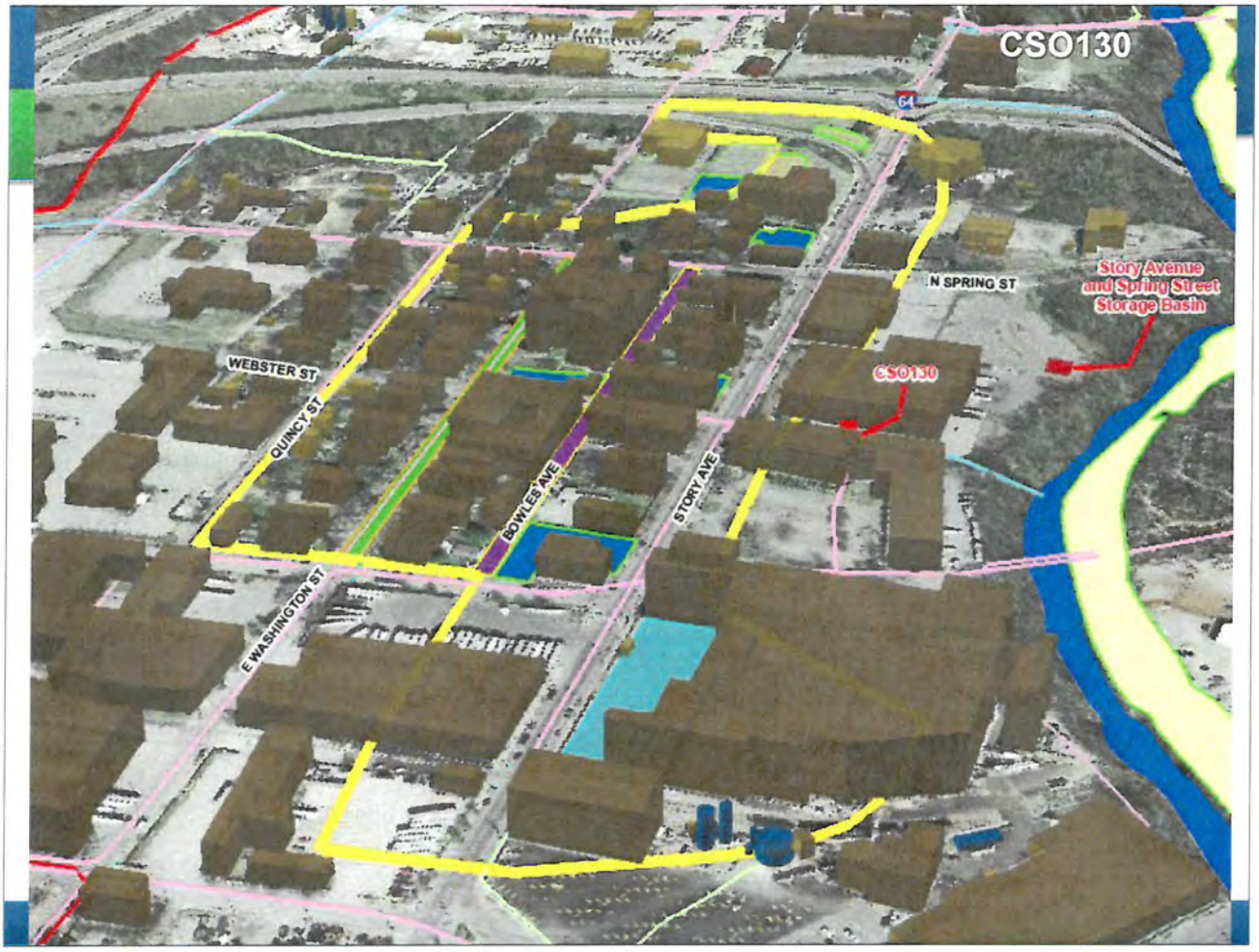
Vine street green roof project performance



Office of Employment Green Projects

State Office of Employment





CSO130 Drainage Area

Drainage Area	Impervious Area	Gray Infrastructure Cost	Percentage Reduction Needed	Impervious Area Needed for Capture	Impervious Area Value	Green Infrastructure Cost
1,237,540 SF (28.4 acres)	895,702 SF (20.5 acres)	$1,576,476	33.4%	300,038SF	$5.33	$993,233

CSO 130 Project Closeout

Rain Barrel Pilot Project

- 100 Homes on Payne Street
- Two Volunteer Days
- Flow Meter Installed

CSO 140 Rain Barrel Pilot

- Customer participation for CSO 140 – 30%
- Rain Barrels subject to seasonal changes and homeowner buy-in
- Six projects, range of participation that MSD has obtained for CSS downspout disconnection
  - Significant MSD assistance: approximately 60% to 90%
  - Customer driven: 9% to 30%

PERFORMANCE OF INSTALLED GREEN INFRASTRUCTURE PROJECTS

Green Partnerships Progress

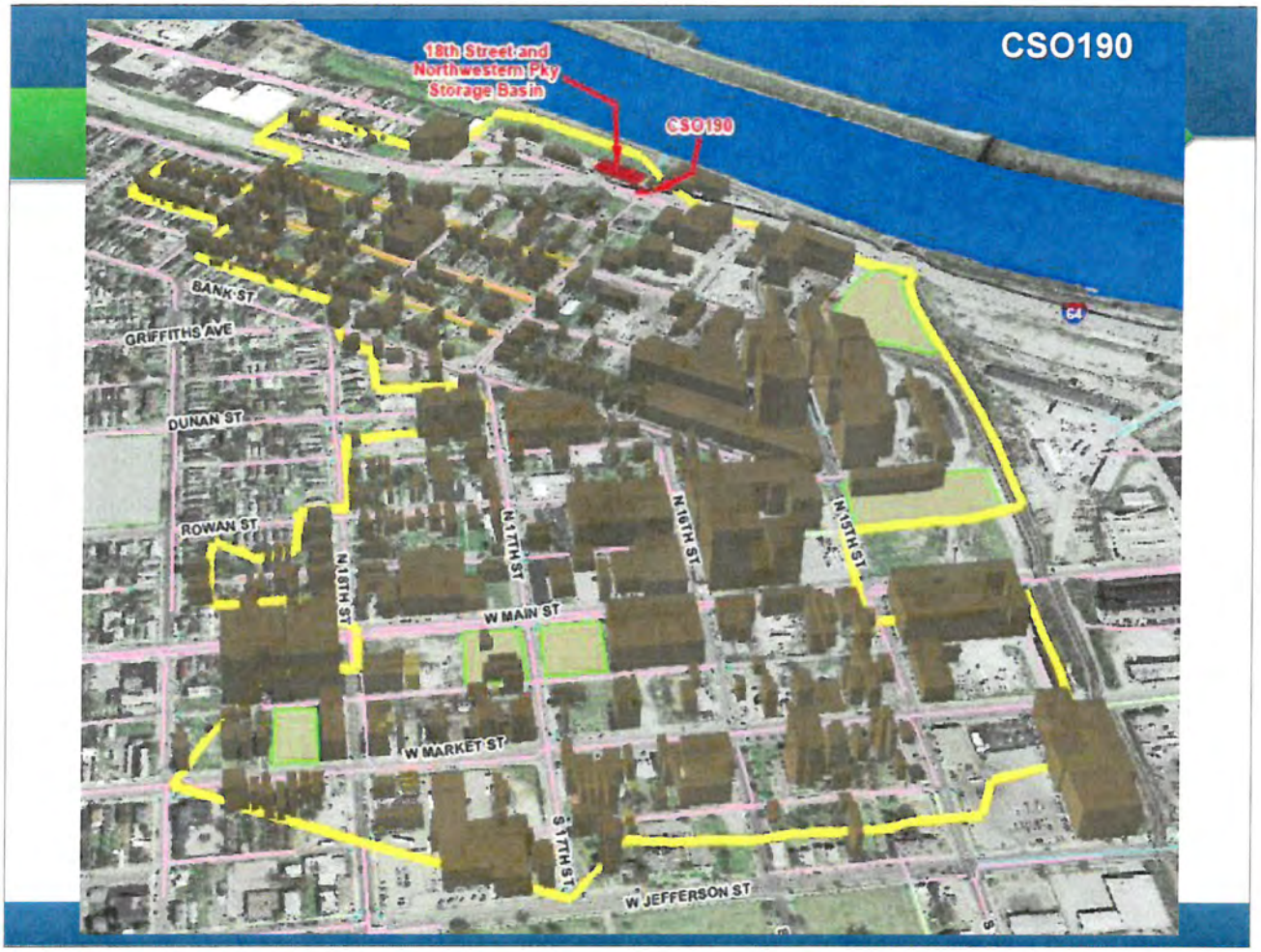
- 97 Projects Committed
- 19 Demo Projects Complete on Time
- $13.3 Million Expended
- Over 9.2 Million sq. ft captured
- 2.7 MG Overflow per Control Event Reduced
- 256 MG Stormwater Captured Annually
- Provides safety margin for target level of control and gray downsizing, in some cases

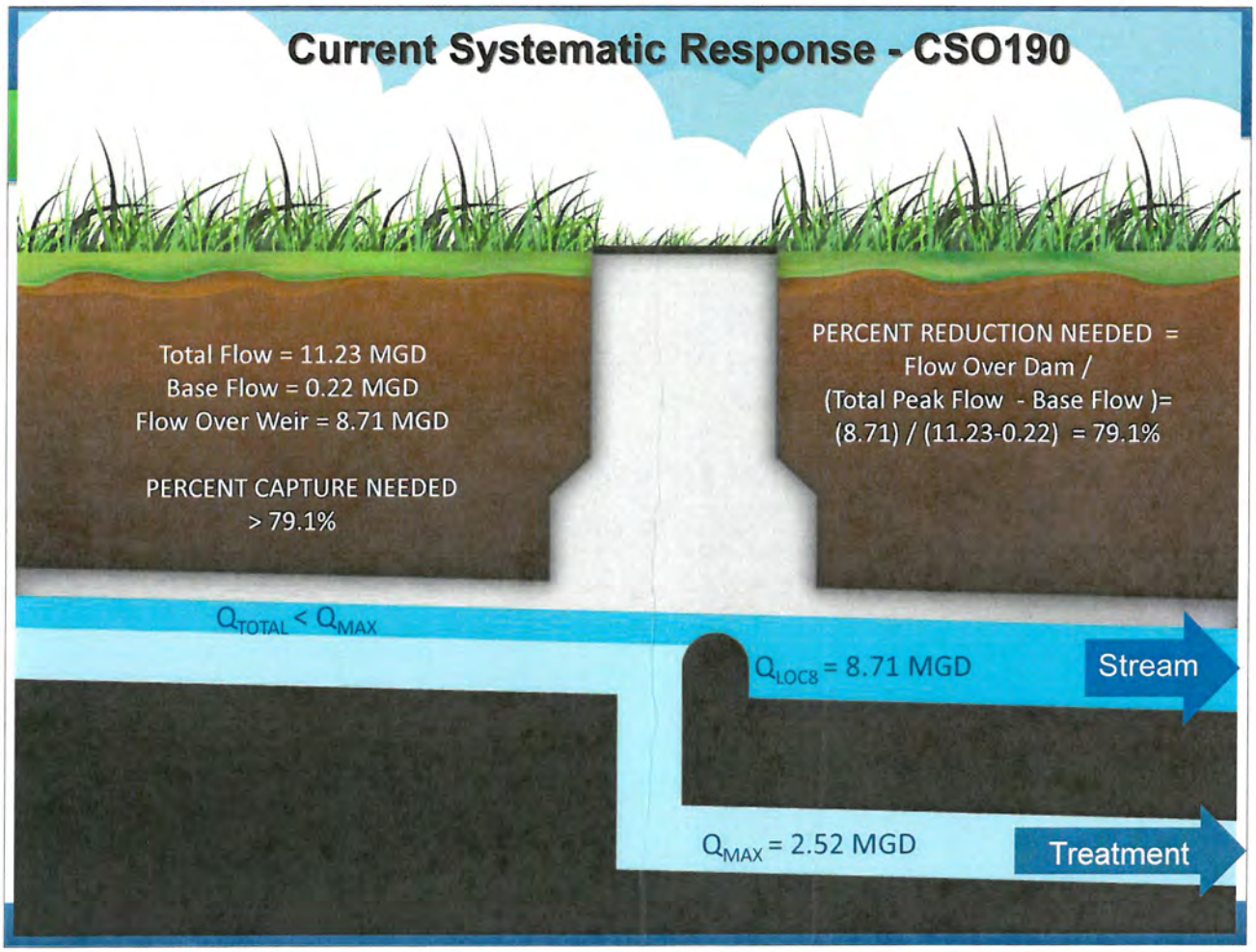
Green Vs. Gray Comparison

- Green Private Property Investments (sans exceptions): $4 Million
- Total Gray Savings: $3.8 Million (Storage Only – No Accounting for Power, Piping, and Flood Prevention)
- 20 – Year Present Value of Gray Treatment (O&M): $2.0 Million
- Targets for Right-Sizing Changed During Modeling. Proposed Program Alterations to Account for Most Recent Model Calibration.
- Investment to Savings is Not Linear – Each Project Area Requires Analysis to Determine the "Critical Mass" of Projects – I.E. Right-sizing

Beargrass Falls Green Project

GREEN INFRASTRUCTURE NEXT STEPS


CSO190
18th Street and Northwestern Pky Storage Basin
CSO190
BANK ST
GRIFFITHS AVE
DUNAN ST
ROWAN ST
N 18TH ST
N 17TH ST
N 16TH ST
N 15TH ST
W MAIN ST
W MARKET ST
S 17TH ST
W JEFFERSON ST
64


Current Systematic Response - CSO190
Total Flow = 11.23 MGD
Base Flow = 0.22 MGD
Flow Over Weir = 8.71 MGD
PERCENT CAPTURE NEEDED
> 79.1%
PERCENT REDUCTION NEEDED =
Flow Over Dam /
(Total Peak Flow - Base Flow)=
(8.71) / (11.23-0.22) = 79.1%
$Q_{TOTAL} < Q_{MAX}$
Q_{LOC8} = 8.71 MGD
Stream
Q_{MAX} = 2.52 MGD
Treatment

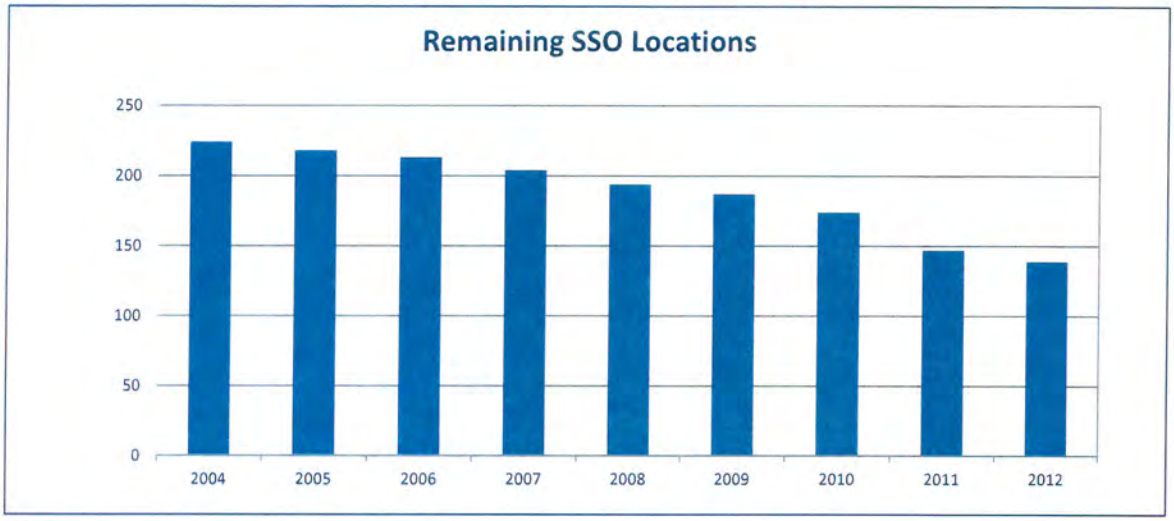
CSO190 Drainage Area

Drainage Area	Impervious Area	Gray Infrastructure Cost	Percentage Reduction Needed	Impervious Area Needed for Capture	Impervious Area Value	Green Infrastructure Cost
6,334,060SF (145.4 acres)	4,213,624 SF (96.7 acres)	$5,000,000	79.1%	3,333,390 SF	$1.35	$4,000,000

PROJECT WIN
Waterway Improvements Now

IOAP Post Construction Compliance Monitoring Program Update

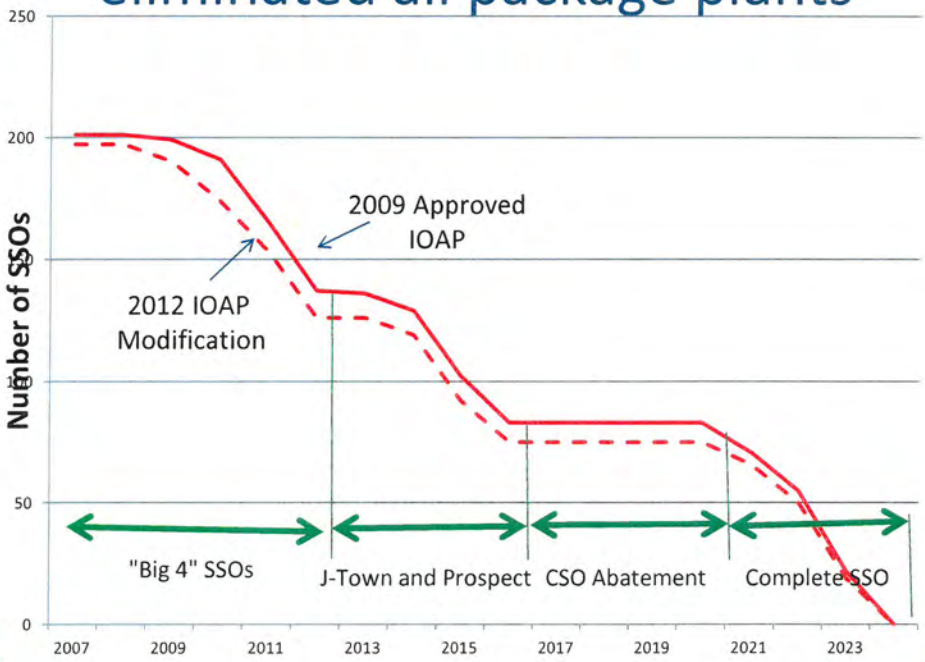
Overflow Eliminations



PROJECT WIN

MSD

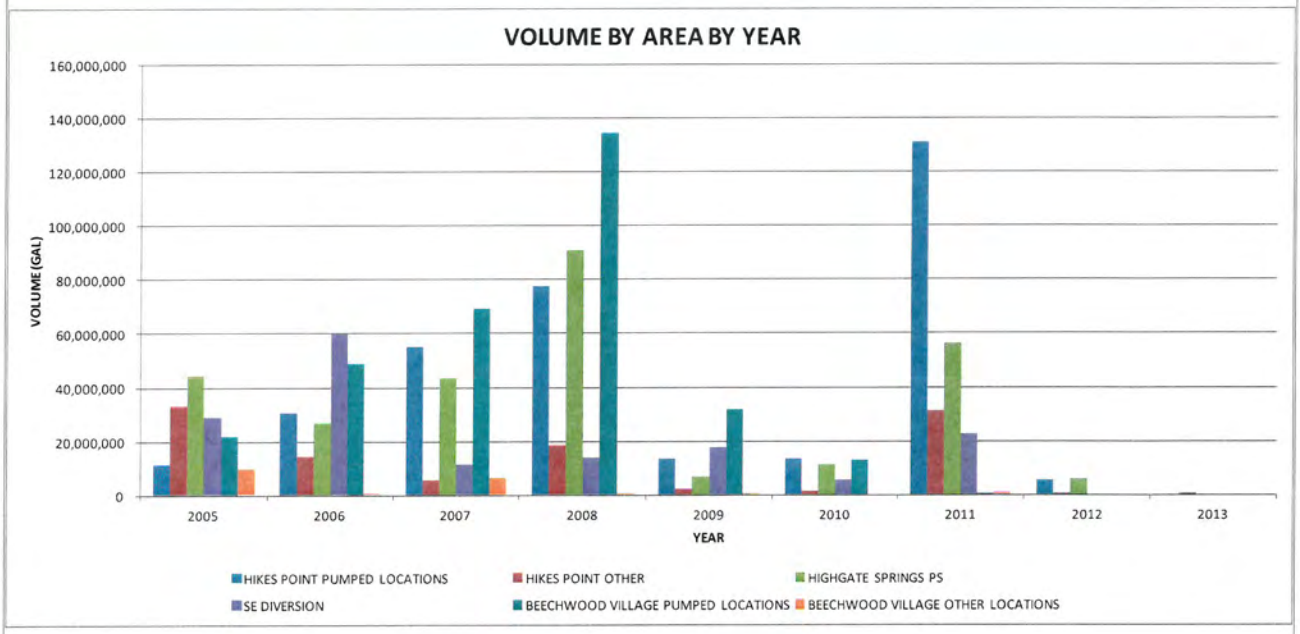
By December 2015, MSD will have eliminated all package plants



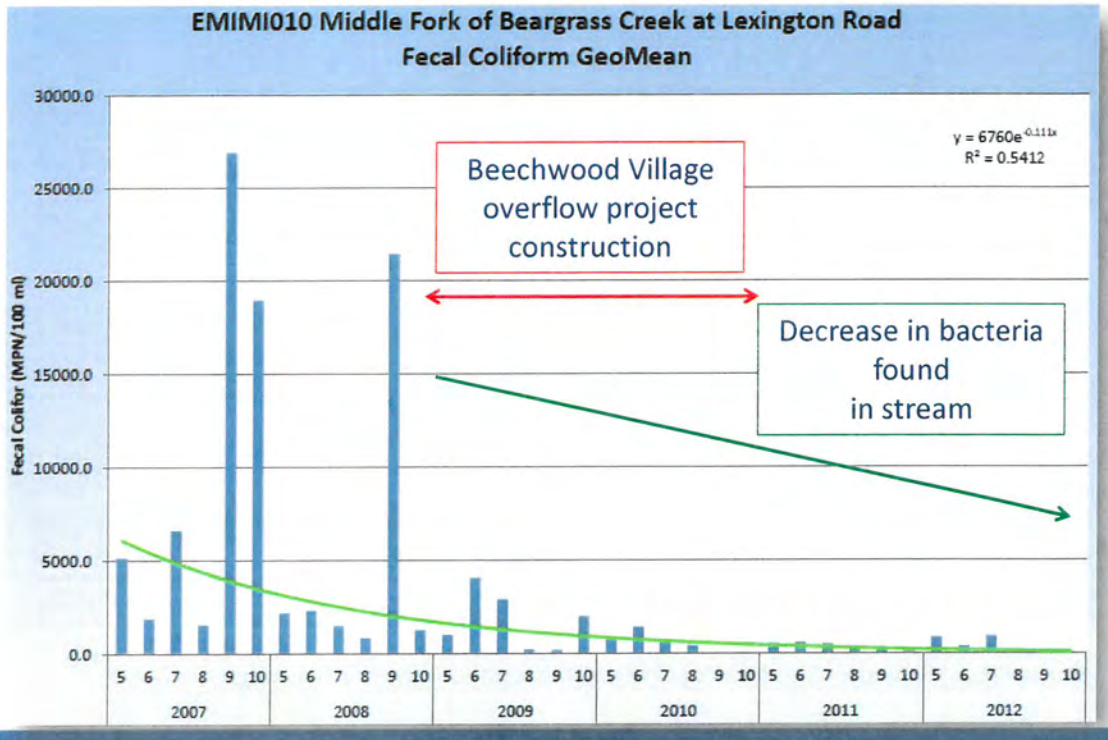
PROJECT WIN

MSD

Volume Reductions in the Big 4 Areas



Pollutant Reduction



Compliance Assessment Collaboration

Contract with the University of Louisville Center for Infrastructure Research

- Assessment of efficacy of completed IOAP projects
- Assessment of specific green control effectiveness
- Assessment of sewer rehabilitation effectiveness
- Socio-economic impacts and comparison of IOAP development approach

IOAP Performance Assessment

- Completed 59 of 123 IOAP projects
- University will perform independent assessment of each project to determine if level of control has been met
- Analysis will utilize sewer modeling results and field monitoring of overflows after construction
- University will provide performance conclusions for regulatory, internal and public reporting
- MSD will use results in annual reporting and to determine if further remedial action is needed

Overflow Assessment & Classification

UNITID	ASSET TYPE	LOCATION	WORK ORDER	ACTIVITY CODE	DATE INITIATED	DATE COMPLETED	RESULT	PROBLEM	RECEIVING STREAM	Rain Event Start	Storm Event Duration for Max Frequency Analysis	Maximum Rainfall Depth (in)	Max Storm Frequency (Years)	Storm Frequency Published Standard	1-Week Antecedent Rainfall Depth (in)	Volume
104231	Sewer Manhole	4119 LEE AVE	2E+06	DISREV	05/05/13	05/07/13	WUS	CAP	CAMP TAYLOR DITCH	05/06/13	1 hr	1.29	0.5	CloudBurst	0.14	7,200
SK14815011	Sewer Service Line	4108 LEE AVE	2E+06	DISREV	05/05/13	05/07/13	WUS	CAP	CAMP TAYLOR DITCH	05/06/13	1 hr	1.29	0.5	CloudBurst	0.14	300
51594	Sewer Manhole	1418 TREVILIAN WAY	2E+06	DISREV	04/16/13	04/16/13	WUS	CAP	H FORK BEARGRASS C	04/16/13	1 hr	0.13	0.11	CloudBurst	1.38	3,750
27116	Sewer Manhole	10304 CAVEN AVE	2E+06	DISREV	05/10/13	05/10/13	WUS	CAP	MUD CREEK	05/10/13	6 hr	0.26	0.14	CloudBurst	1.09	60,000
28340	Sewer Manhole	3620 CHARLANE PKY	2E+06	DISREV	05/10/13	05/11/13	WUS	CAP	CHENOWETH RUN	05/10/13	24 hr	0.51	0.2	CloudBurst	1.19	16,500
28336	Sewer Manhole	9707 WILLOWWOOD WAY	2E+06	DISREV	05/10/13	05/11/13	WUS	CAP	CHENOWETH RUN	05/10/13	24 hr	0.51	0.2	CloudBurst	1.19	18,000
29373	Sewer Main	11201 AMPERE CT	2E+06	DISREV	03/26/13	03/26/13	WUS	STRUC	CHENOWETH RUN	03/24/13	12 hr	1.29	0.5	CloudBurst	0.14	3,330
27116	Sewer Manhole	10304 CAVEN AVE	2E+06	DISREV	05/05/13	05/05/13	WUS	CAP	MUD CREEK	05/06/13	6 hr	0.38	0.21	CloudBurst	0.31	91,000
27005	Sewer Manhole	1012 ALTA CIR	2E+06	DISREV	05/10/13	05/11/13	WUS	CAP	E FORK BEARGRASS C	05/10/13	24 hr	0.53	0.21	CloudBurst	1.04	10,000
MSD1203-P	Sewer Lift Station	4005 KIRBY LN	2E+06	DISREV	05/10/13	05/11/13	WUS	CAP	FERN CREEK	05/10/13	24 hr	0.57	0.22	CloudBurst	1.11	39,000
51594	Sewer Manhole	1418 TREVILIAN WAY	2E+06	DISREV	05/10/13	05/10/13	WUS	CAP	H FORK BEARGRASS C	05/10/13	6 hr	0.39	0.22	CloudBurst	1.11	9,000
MSD0255	Sewer Treatment Plant	10725 OLD TAYLORSVILLE RD	2E+06	DISREV	01/30/13	01/31/13	WUS	BLEND	CHENOWETH RUN	01/30/13	24 hr	0.59	0.23	CloudBurst	0.32	1,712,000
66349	Sewer Manhole	3726 FINCASTLE RD	2E+06	DISREV	05/10/13	05/13/13	WUS	CAP	CAMP TAYLOR DITCH	05/10/13	6 hr	0.41	0.23	CloudBurst	0.14	1,800

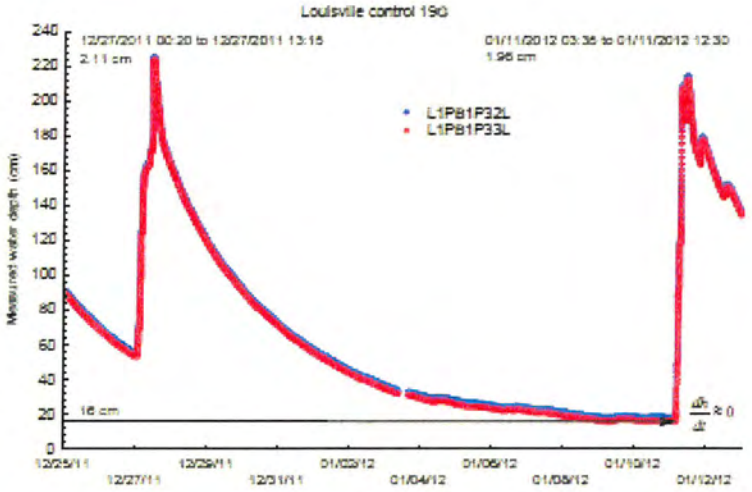
Green Instrumentation

Green Performance Assessment

EPA

The exfiltration rate varies with water depth.

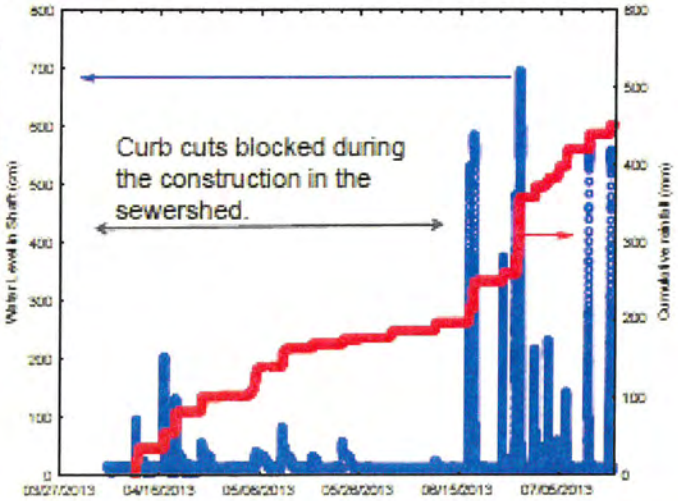
Rainfall data from MSD NEXRAD system collected at 5-minute intervals. Level data collected at 1-minute intervals



Green Performance Assessment

EPA

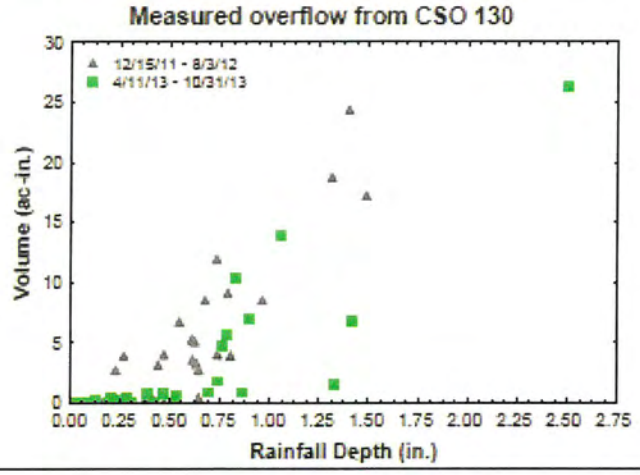
The response shows when sandbags were removed from the tree box.



Regulatory Compliance Assessment

EPA

To meet the consent decree goals, no overflow for events through 1.09 inches. Currently, GI in CSO 130 is managing rain events up to 0.7 inches.



Green Performance & Maintenance Efficacy

Before

After

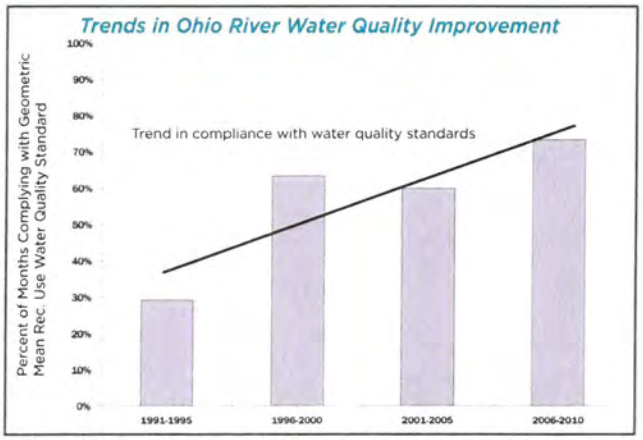
PROJECT WIN
Waterway Improvements Now

Cincinnati MSD Recre8 Program Highlight

Overview of Ohio River Recreation...

PROJECT GROUNDWORK
your pipeline to clean water

- Water quality in the Ohio River has consistently improved over the past 20 years.
- As a result, recreational use standards are met more frequently, making it safer to recreate on the Ohio River.



The overall trend indicates that compliance with safe recreating standards will continue to improve.

Overview of Ohio River Recreation...

Recreation Management Program

Purpose of program:

- Foster public awareness of water quality (*E. coli* counts)
- Assist public health agencies to inform public about health-related issues
- Facilitate informed decisions regarding recreational use of local waterways

Developing the Application

- ANN modeling used to predict bacteria levels in Ohio River at Cincinnati based on real time inputs of:
  - Precipitation (recent and predicted)
  - River stage and velocity
  - Sewer overflows
  - Temperature
- Categorize as low, medium or high risk for both contact and non-contact recreation
- Multiple Stakeholders provided input on other recreation-related features
- Application now has commercial "sponsors" who promote use of the application (marinas, river-front restaurants, etc.)

Why Are We Interested in This?

Louisville MSD's Public Notification Obligation

- Amended Consent Decree/IOAP require notification of potential sewer overflows
  - Reduce public exposure to potential health risks
  - Programmatic (signs, mailings and education program)
  - Event-based (web page, email, etc.)
  - "other electronic" methods implied but not detailed
- Current event based notification tied to rain events and dry weather overflows
  - "Stoplight" system and emails based on start of rain over threshold amount or DWO
  - Very few signed up for email notification
  - "All clear" based on time since rain or DWO ended
- MSD gets frequent calls during water recreation season about safety of rivers and streams
  - No basis for response other than time since last rain

Recr8OhioRiver

PROJECT GROUNDWORK
your pipeline to clean water

iPhone App & Website

- Droid, iPhone app and website are live
- The website

  http://www.recr8ohioriver.org

What Are We Planning to Do?

- Monitor MSDGC's experiences
  - Application downloads
  - "Hits" during recreation season
  - Water quality model accuracy over time
- If MSDGC experience is good, explore similar ANN model for Ohio River at Louisville
  - Focus on Ohio River for initial evaluation
  - Build on MSDGC's "lessons learned" (both good and bad)
  - Build and test model accuracy over time, balancing:
    - Benefit of water quality predictive tool
    - Risk of putting out incorrect risk information if model does not demonstrate long-term self calibration
- Seek Board approval for developing public release if appropriate

PROJECT WIN
Waterway Improvements Now

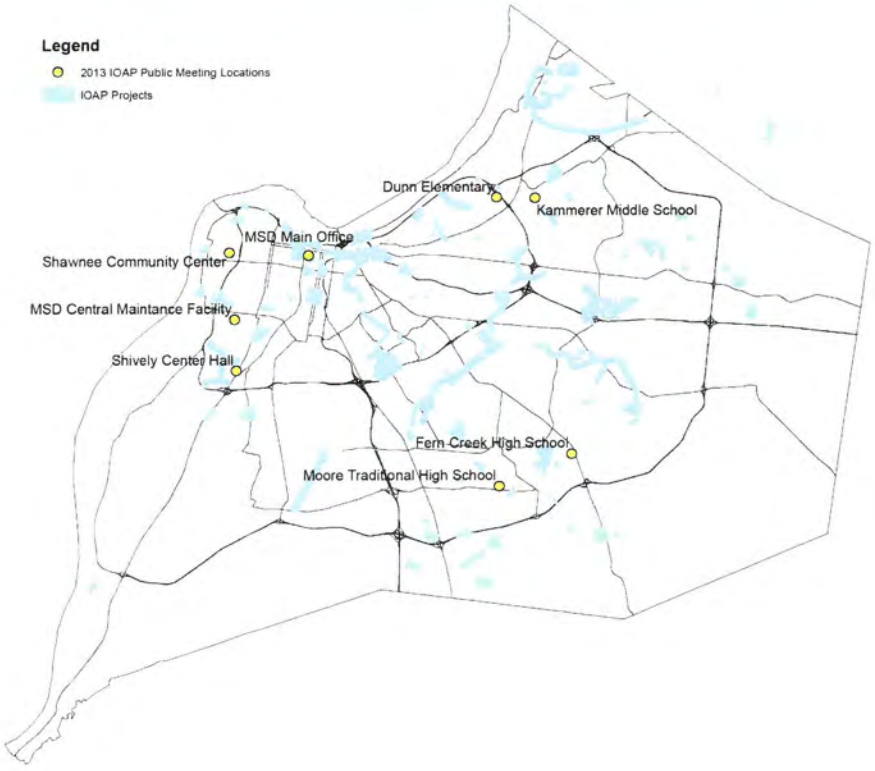
IOAP Public Outreach Program Highlight

IOAP Public Meetings 2013

- Jan 8, 22, 29, Feb 5 - IOAP 2012 Modifications Public Information Sharing
- March 23 – IOAP 2012 Modifications Public Hearing
- May 14 - Jeffersontown Treatment Center Elimination, Chenoweth Hills Treatment Center Elimination, Fairmount Rd Pump Station Storage Basin
- September 24 – Bell's Lane WW Treatment Facility, Southwestern Parkway CSO Basin
- November 5 – Logan Street Basin, Muddy Fork Interceptor/Basin & CSO 88, 93, 131, 140

PROJECT WIN

MSD



IOAP/MS4 Public Education and Outreach

Programmatic Requirements

1. Measure community knowledge and behavior change every 2 years under the IOAP/MS4 Programs
2. Modify outreach program messages/media accordingly
3. Repeat measurement

Approach

1. Phone surveys used previously in 2009 and 2011
2. Data did not show measurable results
3. Revised approach
    1. Focus groups
    2. On-line survey

IOAP/MS4 Public Education and Outreach

Focus Groups

Two sessions conducted October 23

1. 23 participants total
2. Participants recruited with two objectives
    - ✓ Cross section of Louisville households
    - ✓ Include households with children and pets

Objective

1. Assess knowledge gap extent
2. Gain insight into how to better educate and communicate to affect sustained behavior change
3. Provide guidance in developing an on-line survey to measure public's understanding of the impacts of personal behaviors on waterway quality

IOAP/MS4 Public Education and Outreach

Focus Groups Observations

1. Participants demonstrated general lack of understanding on the cause/effect relationship between their personal actions and water pollution caused by rainwater runoff and sanitary sewer system overflow
2. Once moderators imparted basic education of these issues, participants seemed more willing to consider ways in which their personal behaviors could be modified
3. Participants offered ideas on messaging and media opportunities to communicate to the general public, including:
   - ✓ Use of "shock value" and emotional visuals
   - ✓ Cite scientific reports/data
   - ✓ Start education programs in schools
   - ✓ Use social media to alert residents during wet weather events

PROJECT WIN

MSD

IOAP/MS4 Public Education and Outreach

On-Line Survey Focus

1. Define community knowledge gaps
2. Understand individual motivation to initiate personal behavior change
3. Prioritize desired behavior changes
4. Determine appropriate messages and delivery media

Next Steps

1. On-line survey complete by December 31, 2013
2. Analyze information learned from the on-line survey
3. Explore opportunities to engage a broader audience, moving beyond the typical paper mail and public meeting, to include social media engagement, communication and notification options

PROJECT WIN

MSD

IOAP
Review of Next Steps

IOAP Next Steps

- Refining IOAP 2012 Modification with EPA/KDEP staff
- Continue IOAP Public Outreach/Project Input Meetings
- Next WWT Stakeholder Group Meeting Spring 2014
- Alternatives to On-Site Stormwater Quality BMPs Workshop Invitation

PROJECT WIN
Waterway Improvements Now

Observer Comments