

**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<sup>1</sup> 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.]*

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

MSD's strategy for SSO control reflects the fact that SSOs, unlike wet-weather CSOs, are unauthorized discharges that must be "eliminated" under the Clean Water Act. In the IOAP, the values evaluation framework will be used to determine the appropriate level of control of SSOs, although the minimum level of protection is a two-year design storm. A two-year design storm is defined as a storm with a 50 percent probability of occurring in a given year. Based on an analysis of sixty years of historical weather patterns for Jefferson County, the technical team is proposing to use a three-hour "cloud burst" storm, with a statistically anticipated rainfall of 1.8 inches, as the basis for the two-year design storm. The Cities of Atlanta, Cincinnati, and Knoxville also use a two-year design storm as the minimum protection level for SSOs. The approach of using the values evaluation framework to determine the SSO control level means that solutions to address an individual SSO would be designed to protect against larger storms (e.g., a five-year storm instead of a two-year storm) if that would yield a higher benefit-cost ratio in the analysis of project alternatives.

### **Components of MSD's Integrated Overflow Abatement Plan**

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

Driven by the values-based benefit-cost analysis, the IOAP is anticipated to reflect a balanced mix of green and gray solutions to prevent and control sewer overflows. "Green" solutions include options such as green roofs, rain gardens, rain barrels, porous pavement, and bioretention, while "gray" solutions include options such as storage, treatment, conveyance/transport, and sewer separation. In addition to site-specific green infrastructure projects, the IOAP is expected to contain programmatic green solutions that reduce flow at multiple CSO sites (e.g., a rain barrel program) and that may involve partnerships with other public and private entities.

As of June 2008, MSD's technical team is analyzing potential options to control private sources of I&I into the sanitary sewer system, including building laterals, downspouts, sump pumps, and foundation drains. Private-side I&I control is expected to be an important part of the IOAP. Options under consideration include potentially adopting a requirement for inspections of private properties (e.g., during the property transfer process, when building permits are issued, when contractors install roof and gutter systems, when plumbers connect sump pumps, and/or at other times), along with providing some form of cost share and conducting an aggressive education campaign. Although I&I reduction is particularly relevant to SSO control (since the sanitary sewer system was not designed to accept inflow), the technical team is considering whether similar requirements should also apply to the combined sewer system.

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

documented and compared against the estimated targets. The final sizing of the gray solutions will then be based on actual documented performance of the green solutions previously implemented.

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

### **Education Plan**

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

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

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

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

### **Future Development Considerations**

Solutions in the IOAP will consider future development based on the community's long-term land-use plan, Cornerstone 2020.<sup>2</sup> 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

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

activities practices designed to, among other things, investigate capacity-constrained areas of the sewer system. The CMOM program also includes a System Capacity Assurance Program focused on providing capacity for current and future service needs

Continued development in the community will require MSD to implement measures to reduce wet-weather flows. As currently conceived, MSD proposes a three-to-one offset of wet-weather flows from new development. This means that flows entering MSD's sanitary sewer systems will be reduced at a ratio of three gallons for every new gallon added. MSD's flow reduction efforts will be designed to correct deficiencies in the existing sewer system in the same areas of the system affected by the flows from new development. MSD would track flow reduction "credits" to ensure that the flow reductions occur in the appropriate geographic locations to offset the new flows. (This three-to-one offset approach is based on the City of Knoxville's Capacity Assurance Program.) As of June 2008, the MSD Board is considering the fee structure for the offset plan. *[Review Note: Additional information about how the three-to-one offset approach would work in practice will be shared at the June WWT meeting.]*

### **Funding Plan**

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

The funding plan for the IOAP is based on the principle that rates and fees for the IOAP must pay MSD's operating costs and debt service, and must adequately maintain MSD's current bond rating. Furthermore, MSD's rates and fees must allow for continued economic development in the community. In particular, a strong local economy will be important to sustain the affordability of the IOAP. These principles for the funding plan will affect the amount of money MSD may borrow at any one time and the level of increases in rates and fees needed to fund capital and operating expenses for IOAP implementation.

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