

**MASSACHUSETTS WATER RESOURCES
AUTHORITY**



**REGIONAL INFILTRATION/INFLOW
REDUCTION PLAN**

SEPTEMBER 2002



Table of Contents

1. Introduction

1.1. Background..... 1

1.2. Description of the Regional I/I Problem..... 1

1.3. MWRA Initial Efforts Toward I/I Reduction 2

1.4. MWRA’s 1990 I/I Reduction Strategy 2

2. I/I Task Force

2.1. Background..... 4

2.2. I/I Task Force Approach..... 4

2.3. Mission Statement, Goals and Implementation Strategies 5

3. Regional I/I Reduction Plan

3.1. Board of Directors’ Approval 6

3.2. Overview of the Plan 6

3.3. Roles and Responsibilities for Regional Stakeholders 7

3.4. Implementation Schedule 7

3.5. Goal 1..... 8

3.6. Goal 2..... 9

3.7. Goal 3..... 11

3.8. Goal 4..... 13

3.9. Goal 5..... 16

Appendix A May 23, 2001 Staff Summary on Updated Regional I/I Reduction Plan

Appendix B Implementation Schedule for MWRA Regional I/I Reduction Plan



1. INTRODUCTION

1.1 BACKGROUND

The MWRA Board of Directors approved the Regional Infiltration/Inflow (I/I) Reduction Plan on May 23, 2001 and authorized staff to submit the Plan to EPA and DEP as required under MWRA's NPDES Permit. The Regional I/I Reduction Plan combines recommendations from the I/I Task Force Report with existing MWRA I/I reduction initiatives.

MWRA established its initial Regional I/I Reduction Strategy in 1990. The updated Regional Infiltration/Inflow Reduction Plan replaces the 1990 I/I Strategy. The 1990 I/I Strategy was approved by DEP (through an Interagency Agreement signed in April 1991) and served as the basis for MWRA interaction with member communities on I/I issues throughout the 1990s. The severe storm events in October 1996 and June 1998 led to the unusual circumstance of numerous sanitary sewer overflows (SSOs) from regional and local collection systems. In the aftermath of these events, EPA and DEP began an aggressive effort to require MWRA to regulate flows from community sewer systems. Alternatively, in an effort to define system problems, encourage dialogue, develop appropriate solutions and seek consensus, MWRA organized the regional I/I Task Force. The Regional I/I Reduction Plan combines recommendations from the I/I Task Force Report with existing MWRA I/I reduction initiatives.

1.2 DESCRIPTION OF THE REGIONAL I/I PROBLEM

Infiltration and inflow are groundwater and rainwater that enter the sewer systems of both MWRA and its member communities through a variety of defects. High levels of I/I consume capacity in the collection system that would otherwise be available to transport sanitary flow. During periods of high groundwater and large storm events, I/I entering the system causes sewer surcharging, wastewater backups into homes, and local overflows of untreated sewage, as well as increased operating costs.

The average annual wastewater flow contributed from the entire MWRA collection system varies, depending on annual precipitation, from about 335 to 425 mgd. I/I contributes more than half (55% to 65%) of the annual wastewater flow.

Infiltration and inflow are highest in the spring when: (1) rainfall is high (2) the groundwater table is high, (3) snowpack melts, (4) soil is generally more saturated (therefore a lower percentage of stormwater can infiltrate the ground), and (5) evapotranspiration is low. Infiltration and inflow are lowest in the late summer when: (1) rainfall is low (2) the groundwater table is low, (3) soil is generally dry (therefore a high percentage of stormwater can infiltrate the ground) and (4) evapotranspiration of surface and groundwater is high. Infiltration tends to increase and decrease gradually over the course of the year. Conversely, inflow causes a rapid increase in wastewater flow that occurs during and after storms leading to sewer system surcharging and sanitary sewer overflows (SSOs). The volume of inflow that enters the collection system typically depends on the magnitude and duration of a storm event, as well as related impacts



such as snowmelt and storm tides. Few problems exist within the local and regional systems during dry weather or as a result of small and medium storm events (those below the DEP designated 1.7-inch–six hour “design” level). MWRA has a peak transport and treatment capacity of 1.2 billion gallons per day (more than 3 times the 380 mgd average flow).

1.3 MWRA INITIAL EFFORTS TOWARD I/I REDUCTION

The Enabling Act (Chapter 372, Acts of 1984) establishes as a goal of the MWRA the "reduction of infiltration and inflow for the service areas of the Authority..."; the Enabling Act further provides that the MWRA "shall also reasonably provide for abatement, reduction and prevention of infiltration and inflow of ground waters, surface waters or storm waters into the sewer system..." Additionally, the August 2000 NPDES Permit requires MWRA, in cooperation with its member communities, to eliminate excessive I/I to the MWRA sewer system.

MWRA’s Sewer Use Rules & Regulations (360 CMR 10.000) require new sewer systems and existing system replacements or extensions be designed and built to minimize I/I – “to the maximum extent possible.” The Sewer Rules also specifically prohibit the following discharges to the MWRA sewerage system: groundwater, storm water, surface waters, roof or surface runoff, tidewater, subsurface drainage (except as allowed by construction site dewatering permit in a CSO area), non-contact cooling or industrial process waters, and uncontaminated contact cooling or industrial process waters.

1.4 MWRA’s 1990 I/I REDUCTION STRATEGY

On August 1, 1990, the Board of Directors approved a regional I/I reduction strategy that (1) established MWRA as the lead agency to coordinate local I/I issues in the service area, and (2) focussed on I/I reduction and sewer system rehabilitation projects within the 43 member community systems. This management approach was intended to require relatively low capital investment by the MWRA through a best management practices approach. The following items were incorporated: design and construction of the wastewater metering system (completed in 1994), flow-based rate parameters (instituted in FY96), financial assistance for local I/I projects (initiated in 1993), technical and information assistance programs to support community efforts, assistance in establishment of local sewer enterprise funds, and agreement with DEP on minimum I/I reduction requirements for MWRA relief sewer projects. The strategy was developed to meet specific short, mid, and long-term goals, as detailed below.

Short-term goals were based on DEP required I/I reductions for MWRA southern sewer system relief projects. MWRA submitted final I/I reduction plans for each project to DEP in October 1995. Each submittal detailed I/I reduction projects implemented by member communities and MWRA and identified that the minimum I/I reduction requirements had been achieved and that additional I/I efforts were ongoing. MWRA’s short-term goals were successfully completed.



REGIONAL INFILTRATION/INFLOW REDUCTION PLAN

Mid-term goals were based on DEP required removal of 53 mgd of peak inflow from the southern collection system. In December 1995, MWRA submitted a final inflow reduction plan to DEP that detailed I/I reduction projects implemented by member communities and MWRA and identified that more than 53 mgd of peak inflow had been removed for the southern collection system. Also noted in the inflow reduction plan were additional projects that were being performed. MWRA's mid-term goals were successfully completed.

Long-term goals included the elimination of excessive I/I (i.e. I/I that is cost-effective or value-effective to remove per DEP's Guidelines for Performing I/I Analyses) from the regional collection system and ongoing repair/replacement of the local collection system. Significant progress has been made to establish programs aimed at meeting these long-term goals, including wastewater metering, flow-based rate parameters, local financial assistance, technical assistance, etc. These programs, as well as the goal of eliminating excessive I/I, are carried forward into the updated Regional I/I Reduction Plan.



2. I/I TASK FORCE

2.1 BACKGROUND

The Infiltration/Inflow (I/I) Task Force was a broad based coalition consisting of representatives of all 43 MWRA member sewer communities, MWRA Advisory Board, the Wastewater Advisory Committee to the MWRA, Charles River Watershed Association, Fore River Watershed Association, Mystic River Watershed Association, Neponset River Watershed Association, South Shore Chamber of Commerce, Massachusetts DEP, United States EPA, and MWRA. The I/I Task Force was organized by MWRA following discussions with EPA and DEP regarding regional I/I problems. MWRA believed a comprehensive approach to define regional I/I problems and to flesh out appropriate solutions (developed cooperatively by local collection system operators, as well as regulators and environmental advocates) would be more effective than a prescriptive, enforcement based approach. In December 1998 and February 1999, MWRA organized separate South and North System I/I Workshops that were attended by over 200 participants. Consensus was reached that a regional task force was the most effective way to move forward while allowing a broad range of stakeholders to be involved. As a result, MWRA organized the regional I/I Task Force to accomplish two objectives:

- A working group of all stakeholders was established to define system problems, encourage dialog, develop appropriate solutions, and seek consensus.
- Community-based recommendations for I/I and SSO reduction planning were documented in the March 2001 I/I Task Force Report, and were used as a basis to update/revise MWRA's Regional I/I Reduction Plan.

2.2 I/I TASK FORCE APPROACH

The Task Force Report outlines a regional I/I reduction plan based on specific goals and implementation strategies. The report is a guidance document for use by local communities, MWRA, DEP, as well as other regional stakeholders, who may tailor appropriate aspects of the report recommendations to their unique situations. Three important conclusions emerged from early Task Force discussions. First, in regard to regulation of the SSO "problem" by DEP and EPA, more information needed to be developed on the location and frequency of SSOs and backups, especially in community owned collection systems. Second, the establishment of numerical I/I reduction requirements and minimum operation and maintenance performance standards was not appropriate. Instead, the Task Force agreed to cooperatively develop a regional guidance document with recommended implementation strategies to fulfill specific goals. Third, the Task Force concluded that a "one size fits all" program to address varied local collection system problems was impractical; alternatively, the Task Force recommended each community tailor the most appropriate program elements to its specific situation.



This approach is consistent with EPA's proposed national SSO Rules. EPA's proposed regulation on Capacity, Management, Operation and Maintenance (CMOM) of collection systems lists general standards that communities must consider. The draft regulation states: "If you believe that any element of this section is not appropriate or applicable to your CMOM program, your program does not need to address it, but your written summary must explain why that element is not applicable." The Task Force report provides communities and MWRA direction for meeting EPA's proposed SSO Rules.

2.3 MISSION STATEMENT, GOALS, AND IMPLEMENTATION STRATEGIES

The Task Force voted the following mission statement:

The I/I Task Force will develop goals and implementation strategies that will reduce Infiltration/Inflow to optimize local and regional sewer service. The Task Force will make recommendations for cooperative implementation of the goals and strategies by local communities, MWRA, DEP, EPA, and others.

Seven overall goals were identified and approved:

1. Eliminate all sewer system backups;
2. Minimize, with a long-term goal of eliminating, health and environmental impacts of sewer system overflows related to I/I;
3. Remove all (and prevent new) inflow sources from separate sanitary systems;
4. Minimize system-wide infiltration;
5. Educate and involve the public;
6. Develop an operation and maintenance program; and,
7. Improve funding mechanisms for identifying and removing I/I.

The first four goals are listed in order of highest to lowest priority. It is recommended that available resources be targeted to eliminate (or minimize) human health threats and loss of property due to sewer system backups and overflows. For instance, it is appropriate to construct interim measures (such as an emergency, manually operated SSO that directs sewage away from homes or a water supply) while long-term solutions (such as I/I reduction or relief sewers) are implemented. Goals 5 through 7 address critical issues that, because of their importance, were organized into individual goals.

The Task Force Report includes a summary of the discussion related to each of the seven goals. Also, for each goal, a list of specific implementation strategies is recommended. Each strategy details: (1) a recommended activity or action item, (2) who should be responsible for performing the activity; and (3) a recommended implementation schedule.

Copies of the I/I Task Force Report can be obtained from Kristen Hall, Project Manager, MWRA Community Support Program, (617) 788-4831 (email: Kristen.Hall@mwra.state.ma.us).



3. REGIONAL I/I REDUCTION PLAN

3.1 BOARD OF DIRECTORS' APPROVAL

The MWRA Board of Directors approved the Regional Infiltration/Inflow Reduction Plan on May 23, 2001 and authorized staff to submit the Plan to EPA and DEP as required under MWRA's NPDES Permit. The Regional I/I Reduction Plan combines recommendations from the I/I Task Force Report with existing MWRA I/I reduction initiatives. The Staff Summary presented to the Board of Directors is provided as Appendix A.

3.2 OVERVIEW OF THE PLAN

Under the updated plan, MWRA has full legal and fiscal responsibility for implementation of operation, maintenance, and I/I reduction programs for the MWRA-owned interceptor system. Each member community retains full legal and fiscal responsibility for implementation of operation, maintenance, and I/I reduction programs for community-owned sewers. MWRA will provide technical and financial assistance to member communities and work cooperatively with DEP, EPA and other stakeholders to help solve local and regional sewer problems. MWRA's Regional I/I Reduction Plan is organized into five major goals:

- GOAL 1: *MWRA will continue its current operation and maintenance program for the MWRA-owned interceptor system leading to the identification, prioritization, and rehabilitation of structural and I/I problems.*
- GOAL 2: *MWRA will work cooperatively with member communities, DEP, and EPA to eliminate sewer system backups into homes and other buildings and to minimize health and environmental impacts of SSOs related to I/I.*
- GOAL 3: *MWRA will work cooperatively with member communities, DEP, and EPA to reduce I/I in the regional collection system with emphasis on the following: (1) inflow reduction in areas tributary to sewer backups and SSOs, (2) private source inflow reduction, (3) infiltration that may impact groundwater or surface water resources, and (4) excessive infiltration as defined in DEP regulations or guidance documents.*
- GOAL 4: *MWRA will work cooperatively with member communities, DEP, and EPA to expand existing efforts to educate and involve the public regarding regional sewer backup, SSO, and I/I reduction issues.*
- GOAL 5: *MWRA will provide technical assistance and work cooperatively with member communities, DEP, and EPA regarding guidance on local operation and maintenance and capital improvement programs intended to provide a reasonable level of sewer service to local sewer users/ratepayers.*



Details of each of the five goals and implementation schedules are presented in the sections that follow.

3.3 ROLES AND RESPONSIBILITIES FOR REGIONAL STAKEHOLDERS

Appropriate roles and responsibilities for MWRA regarding regional I/I reduction activities are those detailed within this Plan. Appropriate roles and responsibilities for service area communities are detailed within the March 2001 I/I Task Force Report. Consistent with I/I Task Force recommendations, the roles and responsibilities listed below are unsuitable for MWRA or local communities, but are appropriate for DEP and/or other state or federal agencies.

- Management and oversight of local sewer system planning, master planning, comprehensive water resources planning, planning for growth, local sewer extension and connection permitting, mitigation of new sanitary flows, interbasin transfer permitting, etc.
- Regulatory and enforcement regarding SSOs from community-owned sewers (administrative orders, consent orders, etc.) that are not related to an MWRA operation and maintenance problem.
- Issuance of regulations or guidance documents covering statewide sewer system issues, including: I/I reduction guidelines, threshold limits for acceptable or excessive I/I, sewer system operation and maintenance guidelines, sewer inspection and/or testing standards, sewer construction standards, regulatory/enforcement measures to remove private inflow sources, plumbing code revisions, etc.
- Increases to funding available for I/I and CSO reduction projects under the SRF program.

3.4 IMPLEMENTATION SCHEDULE

The I/I Task Force established an implementation schedule for each I/I reduction strategy recommended in the report utilizing “short-term”, “mid-term”, and “long-term” time frames. MWRA has established a similar implementation schedule for I/I reduction strategies in the Regional I/I Reduction Plan. The implementation schedule is defined as follows:

- Short-term: Strategies defined as “short-term” are expected to be completed not more than one to two years after the MWRA Regional I/I Reduction Plan is approved by EPA and MADEP.
- Mid-term: Strategies defined as “mid-term” are expected to be completed not more than two to four years after the MWRA Regional I/I Reduction Plan is approved by EPA and MADEP.



- Long-term: Strategies defined as “long-term” are expected to be completed not more than four to five years after the MWRA Regional I/I Reduction Plan is approved by EPA and MADEP.
- Ongoing: Strategies defined as “ongoing” are recommended to be accomplished on an annual basis or are expected to continue to be accomplished over an extended period after completion of an initial project component. This schedule is dependent on the approval of the MWRA Regional I/I Reduction Plan by EPA and MADEP.

This implementation schedule utilizing “short-term”, “mid-term”, “long-term”, and “ongoing” time frames has been developed to provide some flexibility in establishing priorities as the various strategies under the Regional I/I Reduction Plan are completed. Included within the written description of each I/I reduction strategy is the descriptive implementation schedule.

A more detailed implementation schedule that expands on the “short-term”, “mid-term”, “long-term”, and “ongoing” time frames has been developed and is presented as Appendix B. The implementation schedule for each I/I reduction strategy is presented as a bar graph with specific start and completion points noted. This detailed implementation schedule assumes EPA and MADEP approve the MWRA Regional I/I Reduction Plan on or about January 2003. Progress on implementing each strategy will be reported by MWRA to EPA and MADEP within the I/I reduction summary report submitted annually (by September 1), as required under the NPDES Permit.

3.5 GOAL 1 – O&M PROGRAM FOR THE MWRA-OWNED INTERCEPTOR SYSTEM

Goal 1 under MWRA’s Regional I/I Reduction Plan is:

MWRA will continue its current operation and maintenance program for the MWRA-owned interceptor system leading to the identification, prioritization, and rehabilitation of structural and I/I problems.

This effort will consist of:

- Continuing appropriately phased manhole and internal TV inspection programs of 100 percent of the MWRA-owned interceptor system (except tunnels) and a priority ranking system for scheduling rehabilitation of identified problems.
- Continuing a suitable annual budget to fund rehabilitation of priority projects.

Some of the specific strategies to accomplish this goal are detailed within MWRA’s Collection System O&M Manual and include:



Strategy A: Utilize MWRA's internal TV inspection equipment that currently includes three fully outfitted internal TV inspection vehicles equipped with 6000 feet of multi-conductor cable. MWRA also utilizes an OZ-camera that has a 200X zoom capability. Annual inspection schedules are outlined in MWRA's Collection System O&M Manual. This strategy has an ongoing schedule that has been initiated.

Strategy B: Utilize MWRA's sonar camera to inspect siphons and force mains. Annual inspection schedules are outlined in MWRA's Collection System O&M Manual. This strategy has an ongoing schedule that has been initiated.

Strategy C: Physical inspection of collection system manholes and structures by Operations Division field crews. Annual inspection schedules are outlined in MWRA's Collection System O&M Manual. This strategy has an ongoing schedule that has been initiated.

3.6 GOAL 2 – ELIMINATE SEWER SYSTEM BACKUPS INTO HOMES AND OTHER BUILDINGS AND MINIMIZE HEALTH AND ENVIRONMENTAL IMPACTS OF SSOs RELATED TO I/I

Goal 2 under MWRA's Regional I/I Reduction Plan is:

MWRA will work cooperatively with member communities, DEP, and EPA to eliminate sewer system backups into homes and other buildings and to minimize health and environmental impacts of SSOs related to I/I.

This effort will consist of:

- Providing technical assistance to DEP to develop a uniform format for use by MWRA and its member communities for reporting and recordkeeping of sewer backups and SSOs. The database from this effort may be linked to MWRA's GIS mapping to better define chronic problem areas.
- Prioritizing areas "at risk" for backups and SSOs, analyzing existing health and environmental impacts, and evaluating potential interim mitigation measures (such as emergency overflow structures) and long-term improvements (I/I reduction and/or relief sewer projects) to the MWRA-owned interceptor system. Also, providing technical assistance to member communities (in coordination with watershed groups, plumbing inspectors, etc.) as they perform the same type of activities for their local systems.

Some of the specific strategies to accomplish this goal include:

Strategy A: MWRA will provide technical assistance to DEP to develop a uniform format for use by communities for reporting wastewater backup and sewer system overflow information. A representative group of communities should be consulted for review.



MWRA will provide technical assistance to DEP to develop a system to record the information reported by communities into a usable database format. This database may have the capability to be linked to GIS mapping and the information may be made available to communities, MWRA, DEP, EPA, watershed groups, the general public, etc. upon appropriate request. This strategy has an ongoing schedule that should be initiated in the short-term. Completion of this strategy requires a significant resource commitment by DEP. Collection and recording of sewer backup and SSO information from member community sewer systems is the responsibility of DEP. DEP will be responsible for management of collection and distribution of these records. (Cross-reference this strategy to the I/I Task Force Report recommendations 4.1 Strategy A-2 and 5.2 Strategy B-2)

Strategy B: Once a central information database is established (see Strategy A), MWRA will periodically delineate areas which may be “at risk” for backups and SSOs that may be impacted by the MWRA-owned collection system. MWRA will evaluate potential improvements to the MWRA-owned collection system that may reduce the risk of sewer backups and SSOs. This strategy should be completed in the mid to long-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 4.3 Strategy C-2 and 5.5 Strategy E-2)

Strategy C: Once a central information database is established (see Strategy A) and member communities have delineated areas which may be “at risk” for backups and SSOs, MWRA - jointly with DEP - will provide technical assistance to member communities to evaluate potential improvements to local infrastructure that may reduce the risk of sewer backups and SSOs. MWRA will assist communities to determine if impacts from the regional collection system are an issue. The schedule for this strategy is dependent on prior actions by DEP and member communities. (Cross-reference this strategy to the I/I Task Force Report recommendations 4.3 Strategy C-1 and 5.5 Strategy E-1)

Strategy D: For the MWRA-owned interceptor system, MWRA will review and analyze the health and environmental impacts of existing SSO sites. SSO sites will be prioritized based on the frequency and duration of activations and the resulting health and environmental impacts, including: potential for human contact, impact to water supply, impact to shellfish beds or other economic resources, impact to animal or aquatic habitat, etc. This strategy will be completed in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.3 Strategy C-1)

Strategy E: Utilizing the priority ranking to be completed in Strategy D above, as well as system hydraulic analyses, MWRA (for the MWRA-owned interceptor system) - in conjunction with DEP and EPA - will evaluate the potential to eliminate each overflow. Appropriate I/I reduction and/or relief sewer projects that may eliminate (or minimize) SSOs from MWRA-owned interceptors will be evaluated. This strategy will be initiated in the short to mid-term, however, implementation of projects developed from the evaluation may span beyond the long-term time frame as defined within the Regional I/I Reduction Plan. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.3 Strategy C-2)



Strategy F: For those overflows that are unlikely to be eliminated in the short to mid-term (based on the evaluation from Strategy E, above), MWRA (for the MWRA-owned interceptor system) will consider developing interim measures to relocate or otherwise

mitigate the impact of existing overflows on human and natural resources. The priority ranking (from Strategy D, above) will be utilized in development of interim mitigation measures. This strategy has an ongoing schedule that should be initiated in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.3 Strategy C-3)

Strategy G: MWRA will assist DEP, member communities, and other regional stakeholders to inform local plumbing inspectors of the regional priority of eliminating sewer system backups. Plumbing inspectors will be requested to work more closely with local DPW staff to identify sewer system backup problem areas and locations where backflow prevention devices may be required. MWRA expects to meet this strategy by distributing a letter to the plumbing inspector in each member community that discusses sewer backups, potential public health impacts, backflow prevention, and coordination with the local DPW to identify problem areas. This strategy will be completed in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 4.2 Strategy B-4)

3.7 GOAL 3 – REDUCE I/I IN THE REGIONAL COLLECTION SYSTEM

Goal 3 under MWRA’s Regional I/I Reduction Plan is:

MWRA will work cooperatively with member communities, DEP, and EPA to reduce I/I in the regional collection system with emphasis on the following: (1) inflow reduction in areas tributary to sewer backups and SSOs, (2) private source inflow reduction, (3) infiltration that may impact groundwater or surface water resources, and (4) excessive infiltration as defined in DEP regulations or guidance documents.

This effort will consist of:

- Continuing to analyze wastewater metering data to estimate community I/I and provide this information to member communities. Also, increasing coordination with member communities before and during extreme storms and consider expanding the existing metering - emergency notification system.
- Continuing to provide technical assistance to member communities to establish local I/I removal programs, prioritize projects, evaluate rehabilitation options, etc.
- Continuing to fund the I/I Local Financial Assistance Program and providing assistance to member communities for emergency sewer services (such as cleaning, bypass pumping, TV inspection, etc.).



- As required under MWRA's NPDES Permit, staff have considered the merits of revisions to the current flow-based sewer rate methodology developed by the Advisory Board Rates Committee in 1994-95. The current sewer charge system is efficient and effective, therefore, staff recommend no modifications.

Some of the specific strategies to accomplish this goal include:

Strategy A: MWRA will continue to analyze available MWRA wastewater metering data to estimate community infiltration and inflow rates. MWRA will provide this information along with technical assistance to help interpret the information to member communities. This strategy has an ongoing schedule that has been initiated. (Cross-reference this strategy to the I/I Task Force Report recommendations 6.1 Strategy A-1, and 7.1 Strategy A-1)

Strategy B: MWRA, in cooperation with member communities, will evaluate the feasibility of developing and operating an expanded emergency notification system (ENS). Currently, the MWRA remotely monitors wastewater flow at key locations within the regional collection system before and during wet weather events. Interested communities are notified when sewer system depths reach critical levels. The Authority and member communities use this information to forecast problem areas, predict potential sewer system overflows and deploy work crews. The MWRA's wastewater metering system will be upgraded over the next few years. This upgrade may impact the ENS. MWRA is also investigating, over the next three to five years, the benefits of adding SCADA-type meters at some key locations in the collection system. After completion of the two ongoing projects, MWRA will evaluate whether an ENS system can be used efficiently to provide information at the local level. This strategy will be completed in the long-term or more extended time frame subject to the schedule of the ongoing projects noted above. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.4 Strategy D-1)

Strategy C: MWRA will provide technical assistance to member communities to establish written infiltration and inflow identification and removal programs as outlined in the I/I Task Force Report. This strategy has an ongoing schedule that will be initiated in the short to mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 6.1 Strategy A-1, and 7.1 Strategy A-1)

Strategy D: MWRA will provide technical assistance to member communities that seek to emphasize infiltration removal that may impact groundwater and surface water resource areas. MWRA will provide GIS mapping information to member communities that identifies water resource areas, provides an overlay of local and regional sewers, and delineates watersheds. The I/I Task Force Report recommends communities target areas where infiltration reduction will provide the most meaningful benefit for aquifer recharge, stream flow, wetlands and water levels in lakes and ponds. The Task Force also recommends communities coordinate their infiltration reduction efforts with appropriate EOEAs Watershed Teams, local watershed groups and the local conservation commission. Distribution of MWRA mapping information is intended to assist member communities in fulfilling this I/I



Task Force recommendation. This strategy has an ongoing schedule that will be initiated in the short to mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 7.1 Strategy A-5)

Strategy E: MWRA, in coordination with the MWRA Advisory Board, will continue to fund the I/I Local Financial Assistance Program to provide grants and loans to member sewer communities to fund local I/I reduction projects. Through September 2002, MWRA has authorized a total budget of \$140.75 million to fund this program. Financial assistance is provided through 45 percent grants and 55 percent interest-free loans for eligible projects. The MWRA Board of Directors has approved the program through FY2010. The I/I Local Financial Assistance Program is fully detailed in the “Program Guidelines” document available from the MWRA Community Support Program. This strategy has an ongoing schedule that has been initiated. (Cross-reference this strategy to the I/I Task Force Report recommendation 10.2 Strategy B-1)

Strategy F: MWRA, in coordination with the MWRA Advisory Board, will continue to provide emergency assistance to member communities for sewer services on local collection systems that are routinely performed by MWRA staff for the MWRA-owned interceptor system. Examples of past community assistance provided by MWRA staff include: emergency response assistance, bypass pumping, internal TV inspection, sewer cleaning, flow metering, engineering technical assistance, etc. This strategy has an ongoing schedule that has been initiated. (Cross-reference this strategy to the I/I Task Force Report recommendations 9.6 Strategy F-2, and 10.2 Strategy B-2)

3.8 GOAL 4 – EDUCATE AND INVOLVE THE PUBLIC

Goal 4 under MWRA’s Regional I/I Reduction Plan is:

MWRA will work cooperatively with member communities, DEP, and EPA to expand existing efforts to educate and involve the public regarding regional sewer backup, SSO, and I/I reduction issues.

This effort will consist of:

- Continuing to act as a “clearinghouse” to develop, collect and distribute educational materials; posting educational material on the MWRA web site; developing press releases; organizing (jointly with DEP) periodic demonstration projects and/or workshops; providing information to regional groups, local organizations, and plumbing inspectors; developing links between stakeholder internet sites; developing school education program materials; and informing regional stakeholders on progress to increase state and federal funding; etc.



Some of the specific strategies to accomplish this goal include:

Strategy A: MWRA will act as a “clearinghouse” to collect and distribute information on I/I and SSO issues. Other groups, agencies, associations, community representatives, and local citizens wishing to disseminate information on I/I and SSO issues within the region can provide a copy to MWRA that will be copied and distributed. MWRA staff will maintain a database of contacts with Federal, State and community officials, as well as, local associations and individuals that wish to stay informed on I/I and SSO issues. Summary mailings will be made periodically. MWRA, in coordination with the MWRA Advisory Board, will also act as a clearinghouse to inform regional stakeholders about the progress of efforts to increase state and federal funding for I/I reduction and SSO projects. Regional stakeholders will be advised on the most appropriate time to provide input and lobbying efforts. This strategy has an ongoing schedule that will be initiated in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 8.1 Strategy A-1, 10.4 Strategy C-5, and 10.4 Strategy D-2)

Strategy B: MWRA will develop and distribute a summary of previous information/technology distributions regarding I/I reduction and SSOs. The summary will be organized by topic and distributed to all regional stakeholders in MWRA’s database of contacts. This summary can be used as a tool to help reference previously distributed information. This strategy will be completed in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.1 Strategy A-2)

Strategy C: MWRA, jointly with DEP (and possibly other regional organizations), will organize periodic demonstration projects and/or workshops to bring together regulators, community representatives, vendors, environmental groups, consultants, contractors, etc. Workshops may cover topics such as: new or revised regulations, I/I reduction technologies, updates/progress on Task Force Report recommendations, etc. MWRA and DEP conducted a joint workshop on private source inflow reduction during November 2001. Lessons learned from this workshop will help shape future efforts under this strategy. Completion of this strategy requires a significant resource commitment by DEP. This strategy has an ongoing schedule that will be initiated in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 8.1 Strategy A-3 and 8.2 Strategy B-6)

Strategy D: MWRA will develop a summary of available public education material such as local/regional billing inserts, Water Environment Federation (WEF) brochures, “How-To” pamphlets, etc. The summary will provide information on where to obtain the material. A listing of available public education materials will be posted on the MWRA internet site. MWRA will also make copies of public education material available to communities and local associations. MWRA will pilot this strategy by distributing to member communities sample copies of the “Fat-Free Sewers” brochure developed cooperatively by the Water Environment Federation (WEF) and EPA. MWRA will recommend use of the brochures for public education. This strategy has an ongoing schedule



that will be initiated in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 8.2 Strategy B-1, and 8.2 Strategy B-4)

Strategy E: Depending on the outcome of the summary of available information being developed under Strategy D, MWRA (jointly with DEP, and possibly other regional organizations) may develop informational materials that will educate the public on I/I and SSO issues. This effort may include “how-to” pamphlets that detail a step-by-step process

for disconnecting private inflow sources or similar information. The development of new materials under this strategy will be targeted to fill gaps that are not covered by existing/available public education material. This strategy will be completed in the mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.2 Strategy B-2)

Strategy F: Upon request from member communities, MWRA will assist member communities in providing a link from the local DPW or community internet site to the MWRA internet site. The possibility of a link or reference to other regional bodies that are involved in sewer system issues (such as DEP, EPA, New England Water Environment Association, New England Interstate Water Pollution Control Commission, watershed associations, etc) will also be investigated. This strategy will be completed in the mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.2 Strategy B-3)

Strategy G: MWRA will integrate information on I/I and SSO issues into existing MWRA school education materials. MWRA’s School Education staff will identify what types of materials are appropriate for their programs. This strategy has an ongoing schedule that will be initiated in the mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.3 Strategy C-1)

Strategy H: Upon request from DEP, MWRA will provide technical assistance to DEP to develop and issue DEP press releases prior to and during extreme wet weather events to notify the public of possible sewer system backups and overflow problems. The I/I Task Force Report recommends DEP develop a standardized format that includes a request that system users minimize non-essential water consumption activities and includes a standardized high sewer flow warning. Completion of this strategy is dependent on DEP actions. This strategy has an ongoing schedule that should be initiated in the short to mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.4 Strategy D-2)

Strategy I: Upon request from member communities, MWRA will provide technical assistance to communities to provide residents with information on I/I reduction, SSOs and backups using local cable stations or other media outlets. This strategy has an ongoing schedule that will be initiated in the mid to long-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.2 Strategy B-7)



3.9 GOAL 5 – PROVIDE TECHNICAL ASSISTANCE AND WORK COOPERATIVELY WITH MEMBER COMMUNITIES, DEP, AND EPA REGARDING GUIDANCE ON LOCAL OPERATION AND MAINTENANCE AND CAPITAL IMPROVEMENT PROGRAMS

Goal 5 under MWRA's Regional I/I Reduction Plan is:

MWRA will provide technical assistance and work cooperatively with member communities, DEP, and EPA regarding guidance on local operation and maintenance and capital improvement programs intended to provide a reasonable level of sewer service to local sewer users/ratepayers.

This effort will consist of:

- Providing review comments when the current DEP sewer operation and maintenance guidelines are updated.
- Providing the I/I Task Force Report (which includes recommendations for sewer system operation and maintenance) to all member communities, reviewing local sewer use regulations, and recommending improvements.
- Providing member communities a generic wastewater collection system operation and maintenance manual and SSO response plan that can be used as a template to meet pending EPA SSO Rules.

Some of the specific strategies to accomplish this goal include:

Strategy A: MWRA will provide all member communities a copy of the I/I Task Force Report (which includes recommendations for sewer system operation and maintenance). MWRA will maintain a supply of I/I Task Force Reports and will provide additional copies to MWRA member communities and regional stakeholders, as requested. This strategy has an ongoing schedule that has been initiated.

Strategy B: MWRA will request member communities provide a copy of their existing local Sewer Use Regulations to MWRA, will review those local Regulations that are submitted, and will make recommendations for improvements. MWRA may utilize a committee representing a cross-section of sewer system stakeholders to assist in accomplishing this strategy. This strategy will be completed in the mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 9.1 Strategy A-2)

Strategy C: MWRA will develop a Member Community Collection System Operation and Maintenance Manual Guidance Document and Overflow Response Plan. This guidance document will be provided to all member communities. This strategy will be completed in the short-term.

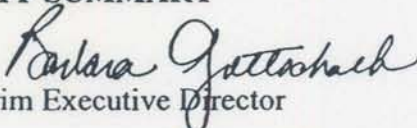


APPENDIX A

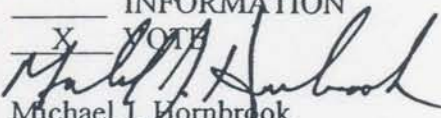
**May 23, 2001 Staff Summary on
Updated Regional I/I Reduction Plan**

STAFF SUMMARY

TO: Board of Directors
FROM: Barbara S. Gottschalk, Interim Executive Director
DATE: May 23, 2001
SUBJECT: Updated Regional I/I Reduction Plan



COMMITTEE: Wastewater Policy and Oversight

INFORMATION
 X VOTE

Michael J. Hornbrook
Chief Operating Officer

CHL Carl H. Leone, Senior Program Manager, Community Support
Preparer/Title

RECOMMENDATION:

That the Board of Directors approve the Updated Regional Infiltration/Inflow (I/I) Reduction Plan and authorize staff to submit the Plan to EPA and DEP (by the end of June 2001) as required under MWRA's NPDES Permit and to authorize staff to negotiate with DEP on an Interagency Agreement concerning regional I/I reduction and SSO issues. Staff are directed to report to the Board on progress concerning these negotiations.

BACKGROUND:

Introduction

MWRA established its current Regional I/I Reduction Strategy in 1990. The 1990 I/I Strategy was approved by DEP (through an Interagency Agreement signed in April 1991) and served as the basis for MWRA interaction with member communities on I/I issues throughout the 1990s. The severe storm events in October 1996 and June 1998 led to the unusual circumstance of numerous sanitary sewer overflows (SSOs) from regional and local collection systems. In the aftermath of these events, EPA and DEP began an aggressive effort to require MWRA to regulate flows from community sewer systems. Alternatively, in an effort to define system problems, encourage dialogue, develop appropriate solutions and seek consensus, MWRA organized the regional I/I Task Force. The proposed Updated Regional I/I Reduction Plan combines recommendations from the I/I Task Force Report with existing MWRA I/I reduction initiatives.

Description of the Regional I/I Problem

Infiltration and inflow are groundwater and rainwater that enter the sewer systems of both MWRA and its member communities through a variety of defects. High levels of I/I consume capacity in the collection system that would otherwise be available to transport sanitary flow. During periods of high groundwater and large storm events, I/I entering the system causes sewer surcharging, wastewater backups into homes, and local overflows of untreated sewage, as well as increased operating costs.

The average annual wastewater flow contributed from the entire MWRA collection system varies, depending on annual precipitation, from about 335 to 425 mgd. I/I contributes more than half (55% to 65%) of the annual wastewater flow.

Infiltration and inflow are highest in the spring when the groundwater table is high, soil is generally more saturated, and a lower percentage of stormwater can infiltrate the ground. Infiltration and inflow are lowest in the late summer when the groundwater table is low, soil is generally dry, and a high percentage of stormwater can infiltrate the ground or be lost through evapotranspiration. Infiltration tends to increase and decrease gradually over the course of the year. Conversely, inflow causes a rapid increase in wastewater flow that occurs during and after storms leading to sewer system surcharging and sanitary sewer overflows (SSOs). The volume of inflow that enters the collection system typically depends on the magnitude and duration of a storm event, as well as related impacts such as snowmelt and storm tides.

Few problems exist within the local and regional systems during dry weather or as a result of small and medium storm events (those below the 1.7-inch "design" level). MWRA has a peak transport and treatment capacity of 1.2 billion gallons per day (more than 3 times the 380 mgd average flow).

MWRA Initial Efforts Toward I/I Reduction

The Enabling Act establishes as a goal of the MWRA the "reduction of infiltration and inflow for the service areas of the Authority..."; the Enabling Act further provides that the MWRA "shall also reasonably provide for abatement, reduction and prevention of infiltration and inflow of ground waters, surface waters or storm waters into the sewer system..." Additionally, the July 2000 NPDES Permit requires MWRA, in cooperation with its member communities, to eliminate "excessive" I/I.

MWRA's Sewer Use Rules & Regulations require new sewer systems and existing system replacements or extensions be designed and built to minimize I/I – "to the maximum extent possible." The Sewer Rules also specifically prohibit the following discharges to the MWRA sewerage system: groundwater, storm water, surface waters, roof or surface runoff, tidewater, subsurface drainage (except as allowed by construction site dewatering permit in a CSO area), non-contact cooling or industrial process waters, and uncontaminated contact cooling or industrial process waters.

MWRA's 1990 I/I Reduction Strategy

On August 1, 1990, the Board of Directors approved a regional I/I reduction strategy that (1) established MWRA as the lead agency to coordinate local I/I issues, and (2) focussed on I/I reduction and sewer system rehabilitation projects within the 43 member community systems. This management approach was intended to require relatively low capital investment by the MWRA through a best management practices approach. The following items were incorporated: design and construction of the wastewater metering system (constructed in 1994), flow-based rate parameters (instituted in FY96), financial assistance for local I/I projects (initiated in 1994), technical and information assistance programs to support community efforts, assistance in establishment of local sewer enterprise funds, and agreement with DEP on minimum I/I

reduction requirements for MWRA relief sewer projects. The strategy was developed to meet specific short, mid, and long-term goals, many of which have been substantially completed.

Short-term goals were based on DEP required I/I reductions for MWRA southern sewer system relief projects. MWRA submitted final I/I reduction plans for each project to DEP in October 1995. Each submittal detailed I/I reduction projects implemented by member communities and MWRA and identified that the minimum I/I reduction requirements had been achieved and that additional I/I efforts were ongoing.

Mid-term goals were based on DEP required removal of 53 mgd of peak inflow from the southern collection system. In December 1995, MWRA submitted a final inflow reduction plan to DEP that detailed I/I reduction projects implemented by member communities and MWRA and identified that more than 53 mgd of peak inflow had been removed for the southern collection system. Also noted in the inflow reduction plan were additional projects that were being performed.

Long-term goals included the elimination of excessive (i.e. cost-effective) I/I from the regional collection system and ongoing repair/replacement of the local collection system. Significant progress has been made to establish programs aimed at meeting these long-term goals, including wastewater metering, flow-based rate parameters, local financial assistance, technical assistance, etc. These programs, as well as the goal of eliminating excessive I/I, are carried forward into the Updated Regional I/I Reduction Plan.

DISCUSSION:

Updated Regional I/I Reduction Plan

The proposed Updated Regional I/I Reduction Plan combines recommendations from the recent I/I Task Force Report with existing MWRA I/I reduction initiatives. Under the updated plan, MWRA has full legal and fiscal responsibility for implementation of operation, maintenance, and I/I reduction programs for the MWRA-owned interceptor system. Each member community retains full legal and fiscal responsibility for implementation of operation, maintenance, and I/I reduction programs for community-owned sewers. MWRA will provide technical and financial assistance to member communities and work cooperatively with DEP, EPA and other stakeholders to help solve local and regional sewer problems. MWRA's Updated Regional I/I Reduction Plan is organized into five major goals:

1. MWRA will continue its current operation and maintenance program for the MWRA-owned interceptor system leading to the identification, prioritization, and rehabilitation of structural and I/I problems. This program consists of:
 - Continuing appropriately phased manhole and internal TV inspection programs of 100 percent of the MWRA-owned interceptor system and a priority ranking system for scheduling rehabilitation of identified problems.
 - Continuing a suitable annual budget to fund rehabilitation of priority projects.

2. MWRA will work cooperatively with member communities, DEP, and EPA to eliminate sewer system backups into homes and other buildings and to minimize health and environmental impacts of SSOs related to I/I. This effort will consist of:
 - Providing technical assistance to DEP to develop a uniform format for use by MWRA and its member communities for reporting and recordkeeping of sewer backups and SSOs. The database from this effort may be linked to MWRA's GIS mapping to better define chronic problem areas.
 - Prioritizing areas "at risk" for backups and SSOs, analyzing existing health and environmental impacts, and evaluating potential interim mitigation measures (such as emergency overflow structures) and long-term improvements (I/I reduction and/or relief sewer projects) to the MWRA-owned interceptor system. Also, providing technical assistance to member communities (in coordination with watershed groups, plumbing inspectors, etc.) as they perform the same type of activities for their local systems.
3. MWRA will work cooperatively with member communities, DEP, and EPA to reduce I/I in the regional collection system with emphasis on the following: (1) inflow reduction in areas tributary to sewer backups and SSOs, (2) private source inflow reduction, (3) infiltration that may impact groundwater or surface water resources, and (4) excessive infiltration as defined in DEP regulations or guidance documents. MWRA efforts will consist of:
 - Continuing to analyze wastewater metering data to estimate community I/I and provide this information to member communities. Also, increase coordination with member communities before and during extreme storms and consider expanding the existing emergency notification metering system.
 - Continuing to provide technical assistance to member communities to establish local I/I removal programs, prioritize projects, evaluate rehabilitation options, etc.
 - Continuing to fund the I/I Local Financial Assistance Program and to provide assistance to member communities for emergency services (such as cleaning, bypass pumping, TV inspection, etc.). To support this program, a recommendation for an additional \$40 million is included in the proposed FY02-04 CIP. MWRA staff will continue to work with the Advisory Board to explore alternatives to maximize the efficient use of community assistance resources.
 - As required under MWRA's NPDES Permit, staff have considered the merits of revisions to the current flow-based sewer rate methodology developed by the Advisory Board Rates Committee in 1994-95. The current sewer charge system is efficient and effective, therefore, staff recommend no modifications.
4. MWRA will work cooperatively with member communities, DEP, and EPA to expand existing efforts to educate and involve the public regarding regional sewer backup, SSO, and I/I reduction issues, including:
 - Continuing to act as a "clearinghouse" to develop, collect and distribute educational materials; posting educational material on the MWRA web site; developing press

releases; organizing (jointly with DEP) periodic demonstration projects and/or workshops; providing information to regional groups, local organizations, and plumbing inspectors; developing links between stakeholder internet sites; developing school education program materials; and informing regional stakeholders on progress to increase state and federal funding; etc.

5. MWRA will provide technical assistance and work cooperatively with member communities, DEP, and EPA regarding guidance on local operation and maintenance and capital improvement programs intended to provide a reasonable level of sewer service to local sewer users/ratepayers. This effort will consist of:
 - Providing review comments when the current DEP sewer operation and maintenance guidelines are updated.
 - Providing the I/I Task Force Report (which includes recommendations for sewer system operation and maintenance) to all member communities, reviewing local sewer use regulations, and recommending improvements.
 - Providing member communities a generic wastewater collection system operation and maintenance manual and SSO response plan that can be used as a template to meet pending EPA SSO Rules.

Interagency Agreement Between DEP and MWRA

As noted in the February 1999 Braintree/Weymouth Administrative Consent Order and the MWRA's July 2000 NPDES Permit, DEP and MWRA have agreed to enter into an Interagency Agreement concerning regional I/I reduction and SSO issues (by July 31, 2001). Negotiations leading to an Interagency Agreement are expected to include discussion of appropriate roles and responsibilities among member communities, MWRA and DEP, including regulatory and enforcement issues. As negotiations with DEP progress, staff will provide updates to the Board.

Staff will propose to DEP that the appropriate roles and responsibilities for MWRA are those outlined within the Updated Regional I/I Reduction Plan. Staff will further propose to DEP that, consistent with I/I Task Force recommendations, the roles and responsibilities listed below are unsuitable for MWRA, but appropriate for DEP and/or other state or federal agencies.

RECOMMENDATIONS FOR DEP/EPA RESPONSIBILITIES

- Management and oversight of local sewer system planning, master planning, comprehensive water resources planning, planning for growth, local sewer extension and connection permitting, mitigation of new sanitary flows, interbasin transfer permitting, etc.
- Regulatory and enforcement issues regarding SSOs from community-owned sewers (including 19 existing DEP Administrative Orders) that are not related to an MWRA operation and maintenance problem.
- Issuance of regulations or guidance documents covering statewide sewer system issues, including: I/I reduction guidelines, threshold limits for acceptable or excessive I/I, sewer system operation and maintenance guidelines, sewer inspection and/or testing standards, sewer construction standards, new enforcement measures to remove private inflow sources, plumbing codes, etc.
- Increases to funding available for I/I and SSO reduction projects under the SRF program.

BUDGET/FISCAL IMPACT:

The proposed Updated Regional I/I Reduction Plan is intended to continue the best management practices approach requiring a relatively low capital investment by the MWRA beyond the current level. However, it is likely that DEP will request MWRA implement and/or fund additional I/I reduction activities over and above those recommended by the I/I Task Force and incorporated in the proposed Plan.

Two existing Programs within the CIP directly involve regional I/I reduction planning:

- The \$100 million I/I Local Financial Assistance Program provides grant and loan funding for local I/I reduction projects. A total of \$65 million has been distributed, and an additional \$40 million is recommended in the FY02 – 04 CIP.
- The \$500,000 Regional I/I Management Planning Project will develop documents for submittal to EPA to satisfy portions of the Authority's NPDES permit conditions.

These programs are managed by the Community Support Program within the Planning Department. This group has 8 staff members. Approximately 40% of staff time, or the equivalent of three full time employees, is spent administering the I/I Local Financial Assistance Program and the Regional I/I Management Planning Project. At this time, no substantial increase in level of effort is expected over the long term.

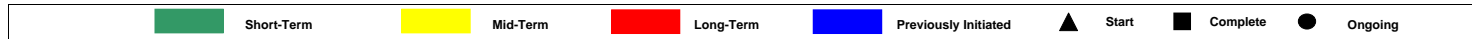


APPENDIX B

Implementation Schedule for MWRA Regional I/I Reduction Plan

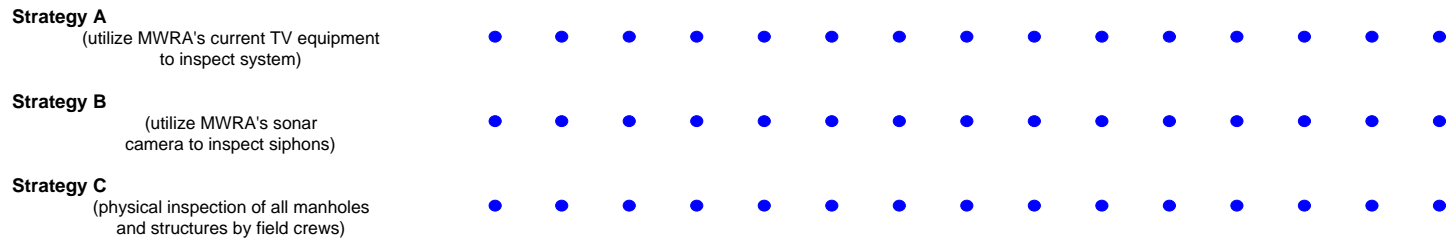
Implementation Schedule for MWRA Regional I/I Reduction Plan

This detailed implementation schedule assumes EPA and MA DEP approve the MWRA Regional I/I Reduction Plan on or about January 2003

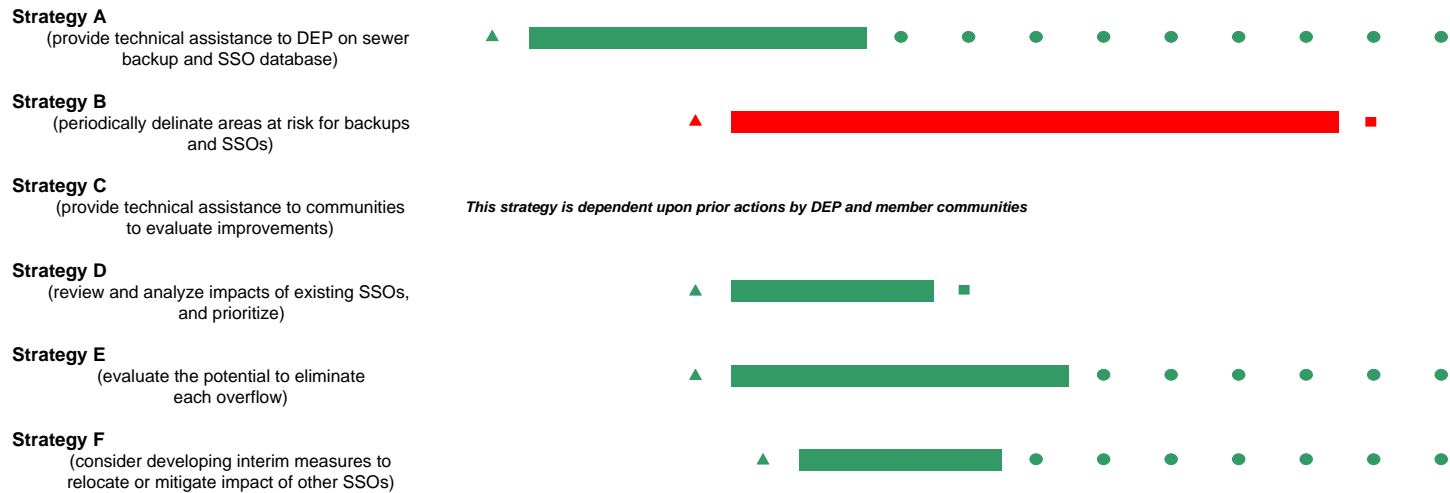


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Goal 1 O&M Program for the MWRA-Owned Interceptor System

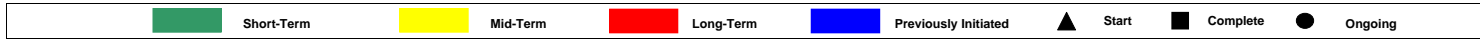


Goal 2 Eliminate Sewer System Backups Into Homes and Other Buildings and Minimize Health and Environmental Impacts of SSOs Related to I/I



Implementation Schedule for MWRA Regional I/I Reduction Plan

This detailed implementation schedule assumes EPA and MA DEP approve the MWRA Regional I/I Reduction Plan on or about January 2003



Jul-01 Jan-02 Jul-02 Jan-03 Jul-03 Jan-04 Jul-04 Jan-05 Jul-05 Jan-06 Jul-06 Jan-07 Jul-07 Jan-08 Jul-08

Strategy G
(assist DEP in educating plumbing inspectors of priority of eliminating backups)



Goal 3 Reduce I/I in the Regional Collection System

Strategy A
(continue to analyze metering data to estimate community I/I rates)



Strategy B
(evaluate feasibility of developing & operating an expanded emergency notification system)



Strategy C
(provide tech assistance to communities re: written I/I identification & removal programs)



Strategy D
(provide tech assistance to communities to emphasize infiltration removal that impacts water resource areas)



Strategy E
(continue to fund the I/I Local Financial Assistance Program)



Strategy F
(continue to provide emergency assistance to communities for sewer services)



Goal 4 Educate and Involve the Public

Strategy A
(act as a "clearinghouse" for info on I/I and SSOs)



Strategy B
(develop and distribute summary of previously distributed information)



Strategy C
(together with DEP, organize periodic demonstrations and/or workshops)



Implementation Schedule for MWRA Regional I/I Reduction Plan

This detailed implementation schedule assumes EPA and MA DEP approve the MWRA Regional I/I Reduction Plan on or about January 2003

