August 28, 2018

Ms. Karen McGuire
USEPA Region 1 – New England
Mail Code OES04-5
Boston, MA 02109-3912

Mr. Lealdon Langley
MA Department of Environmental Protection
1 Winter Street
Boston, MA 02108

RE: Massachusetts Water Resources Authority NPDES Permit Number MA0103284 – MWRA Annual Infiltration and Inflow (I/I) Reduction Report for Fiscal Year 2018

Dear Ms. McGuire and Mr. Langley:

In compliance with the requirements of MWRA's NPDES Permit MA0103284 - Part I, Item 18.bb (ii) "Infiltration/Inflow" (page 28 of 32), the Authority submits this cover letter and the six Attachments listed below that together comprise the MWRA Annual Infiltration and Inflow (I/I) Reduction Report for Fiscal Year 2018.

Attachment 1 – Overview of MWRA Regional I/I Reduction Plan
Attachment 2 – MWRA Regional I/I Reduction Plan – FY18 Progress Update and Detailed Implementation Schedule for FY19 Activities
Attachment 3 – MWRA Actions Taken to Reduce I/I During FY18
Attachment 4 – Status Update on MWRA's I/I Local Financial Assistance Program
Attachment 5 – I/I Reduction Status Update for Member Communities
Attachment 6 – CY17 Community Wastewater Flow Data

Should you require additional information, please contact Carl H. Leone, Senior Program Manager, Community Support Program at (617) 788-4356.

Sincerely,

David W. Coppes, P.E.
Chief Operating Officer

cc: MassDEP - Regulatory Branch, Boston
MassDEP - SERO
MassDEP - NERO
Kevin Brander, MassDEP, NERO
David Butler, MassDEP, NERO
Betsy Reilley, MWRA, Environmental Quality
Wendy Leo, MWRA, Environmental Quality
Carl H. Leone, MWRA, Planning

ATTACHMENT 1
TO
MWRA ANNUAL I/I REDUCTION REPORT FOR FY18
Reporting Period – July 2017 Through June 2018

OVERVIEW OF MWRA REGIONAL I/I REDUCTION PLAN

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 plan was submitted to EPA and DEP in June 2001 and DEP approved the plan in a letter dated November 19, 2002. A full copy of the Regional I/I Reduction Plan (dated September 2002) was included as Attachment 2 to the August 29, 2003 MWRA Annual I/I Reduction Report for FY03. The Regional I/I Reduction Plan is available at http://www.mwra.com/comsupport/communitysupportmain.html.

The Regional I/I Reduction Plan combines recommendations from the I/I Task Force Report (March 2001) with ongoing MWRA I/I reduction initiatives. The updated plan replaces the Authority's 1990 I/I Reduction Policy. Implementation of the Regional I/I Reduction Plan focuses on the cooperative efforts of member communities, DEP, EPA and MWRA to develop and implement I/I reduction and sewer system rehabilitation projects.

Under the 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:

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.

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.

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.

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.

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.

ATTACHMENT 2
TO
MWRA ANNUAL I/I REDUCTION REPORT FOR FY18
Reporting Period – July 2017 Through June 2018

MWRA REGIONAL I/I REDUCTION PLAN - FY18 PROGRESS UPDATE AND DETAILED IMPLEMENTATION SCHEDULE FOR FY19 ACTIVITIES

This document provides a progress update for FY18 accomplishments and a description of the activities to be accomplished during FY19 for each of the I/I reduction strategies in the MWRA Regional I/I Reduction Plan. The update appears in bold type directly below each I/I reduction strategy. This document is intended to satisfy condition 5 of DEP's November 19, 2002 letter approving the MWRA Regional I/I Reduction Plan.

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.*

Strategy A: Utilize MWRA's internal TV inspection equipment that currently includes one 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.

Work by MWRA under these three Strategies is ongoing.

During FY18, MWRA properly operated and maintained the MWRA-owned interceptor system. Annual performance targets and ongoing accomplishments are tracked as part of the Authority's MAXIMO maintenance database and are reported monthly to MWRA senior management. Specific activities undertaken by MWRA for FY18 are detailed in Attachment 3. Additional information on MWRA's FY18 maintenance activities is provided under separate submittal - NPDES Part I.18.g Annual Maintenance Status Sheets.

During FY19, MWRA will continue to properly operate and maintain the MWRA-owned interceptor system.

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.*

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)

Work by MWRA under this Strategy is complete as noted below.

During spring 2001 MWRA provided MassDEP a draft SSO reporting/record keeping electronic database format that was developed by Malcolm-Pirnie, Inc. under contract to MWRA. This work was completed by MWRA as technical assistance to MassDEP. A follow-up letter dated June 20, 2001 requested MassDEP identify the format for finalizing the SSO reporting/record keeping electronic database.

During FY04, MassDEP (in conjunction with staff in the Massachusetts Information Technology Division), developed a revised format SSO electronic database package. This project was part of statewide efforts to upgrade computerized resources and electronic access. The system was demonstrated at an April 8, 2004 MassDEP/MWRA joint community workshop.

In May 2005, MassDEP developed a revised Reporting Form "Sanitary Sewer Overflow/Bypass/Backup Notification Form (rev 05/2005)." This form was made available on the MassDEP web site and reporting was via FAX or by mail. Following development of the web based reporting form by MassDEP, roll-out of the SSO reporting/record keeping electronic database was not completed.

In January 2013, MassDEP developed the most recent revised Reporting Form "Sanitary Sewer Overflow (SSO)/Bypass Notification Form (rev 01/2013)." As of July 2018, this pdf form is available on the MassDEP web site and reporting using the form is via FAX or by mail.

As requested by MassDEP, on August 22, 2011 MWRA provided MassDEP specific SSO site location information for SSO's on MWRA-owned northern system sewers (for events during the period January 2000 through June 2011), including street location, longitude and latitude location, and GIS site maps.

During FY16, MWRA added more specific information on SSOs on the MWRA web site at: http://www.mwra.com/03sewer/html/sso.html. This information includes information on what an SSO is, public health impacts, how SSOs can be prevented, and what MWRA does when an SSO occurs. The web site also includes an interactive GIS site map for SSOs that have been reported by MWRA for the following SSO event display selections: currently active, past 2 days, past 30 days, and past 12 months.

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)

Work by MWRA under this Strategy is complete as noted below. Some ongoing work performed by MWRA that is associated with this Strategy is also noted.

MWRA utilizes MassDEP's Sanitary Sewer Overflow (SSO)/Bypass Notification Form (rev 01/2013) to report SSOs from MWRA's collection system.

MWRA does not have SSOs related to dry weather sewer system capacity issues. MWRA does not have SSOs related to wet weather sewer capacity issues for rainfall events at or below the MassDEP recommended standard design storm for inflow having a one-year recurrence interval and a duration of six hours (see MassDEP's Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys – Revised May 2017). The one-year, six-hour storm produces approximately 1.72 inches of rainfall in the Boston area. During extreme storm events that exceed the MassDEP recommended design storm, I/I entering the upstream community-owned collection systems may cause an occasional SSO in the MWRA regional interceptor system.

During FY18, MWRA continued its ongoing priority program to clean and inspect all inverted siphons in the MWRA-owned collection system. This program is intended to minimize potential SSOs upstream of siphons and reduce the risk of hydraulic limitations and/or blockage from debris buildup in siphon barrels. The cleaning and inspection program will continue in FY19.

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)

MassDEP's roll-out of the SSO reporting/record keeping electronic database was not completed (see Strategy A above).

As part of its ongoing program to support member community I/I reduction and sewer system rehabilitation programs, MWRA offers technical assistance to communities to review local I/I reduction plans and local/regional SSO problems. MWRA also offers

member communities financial assistance for I/I reduction projects. During FY19, at the request of member communities, MWRA will continue to provide technical and financial assistance on local sewer system projects.

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)

Work by MWRA under this Strategy is complete. As previously stated, MWRA does not have SSOs related to dry weather sewer system capacity issues. MWRA also does not have SSOs related to wet weather sewer capacity issues for rainfall events at or below the MassDEP recommended standard design storm for inflow having a one-year recurrence interval and a duration of six hours (see MassDEP's Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys – Revised May 2017). Since prior SSOs have been eliminated for sewer capacity issues at or below the collection system design standard for inflow, additional work under this strategy is not necessary.

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)

Work by MWRA under this Strategy is complete as noted below. Some ongoing work that is associated with this Strategy is also noted.

As previously stated, MWRA does not have SSOs related to dry weather sewer system capacity issues. MWRA also does not have SSOs related to wet weather sewer capacity issues for rainfall events at or below the MassDEP recommended standard design storm for inflow having a one-year recurrence interval and a duration of six hours (see MassDEP's Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys – Revised May 2017). Since prior SSOs have been eliminated for sewer capacity issues at or below the collection system design standard for inflow, additional work under this strategy is not necessary.

During FY14 (as of April 25, 2014), MassDEP revised its Regulation 314 CMR 12.00 *Operation, Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers*. The revisions include a requirement for all public entities that own a sewer system to complete an I/I analysis by December 31, 2017. The analysis also must specifically include an assessment of the risk of sewer system overflows.

As part of its ongoing program to support member community I/I reduction and sewer system rehabilitation programs, MWRA offers technical assistance to communities to review local I/I reduction plans and local/regional SSO problems. MWRA also offers

member communities financial assistance for I/I reduction projects. During FY19, at the request of member communities, MWRA will continue to provide technical and financial assistance on local sewer system projects. MWRA will also continue to work on projects in the MWRA Capital Improvement Program, as summarized in Attachment 3.

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)

Work by MWRA under this Strategy is ongoing.

As previously stated, MWRA does not have SSOs related to dry weather sewer system capacity issues. MWRA also does not have SSOs related to wet weather sewer capacity issues for rainfall events at or below the MassDEP recommended standard design storm for inflow having a one-year recurrence interval and a duration of six hours (see MassDEP's Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys – Revised May 2017). The one-year, six-hour storm produces approximately 1.72 inches of rainfall in the Boston area.

During FY18, MWRA continued its ongoing priority program to clean and inspect all inverted siphons in the MWRA-owned collection system. This program is intended to minimize potential SSOs upstream of siphons and reduce the risk of hydraulic limitations and/or blockage from debris buildup in siphon barrels. The cleaning and inspection program will continue in FY19.

During extreme storm events that exceed the MassDEP recommended standard design storm for inflow, I/I entering the upstream community-owned collection systems may cause an occasional SSO in the MWRA regional interceptor system. Continued coordination with member communities to reduce I/I from local collection systems will help to minimize SSOs that may occur during extreme storm events. Most recently (beginning in FY19), an additional $200 million in 75% grants and 25% interest-free loans was added as Phases 11 and 12 ($100 million for each Phase) of the I/I Local Financial Assistance Program to help fund community I/I reduction projects. MWRA also enhanced the community I/I funding program by adding a $100 million loan only Phase 13 as an additional resource for the communities most aggressively utilizing the MWRA financial assistance program. MWRA's commitment to fund local sewer rehabilitation projects under the I/I Local Financial Assistance Program totals $760.75 million. Through FY18, $354 million in grants and interest-free loans has been distributed to 43 member sewer communities to fund 545 local projects (see details in Attachment 4).

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)

Work by MWRA under this Strategy is complete as noted below.

On September 26, 2005, MWRA distributed an informational package on Sewer Backups and Sanitary Sewer Overflows to all service area community plumbing inspectors, Health Departments (Boards of Health), DPW Directors, Engineering Departments, and collection system operators. The package included information from fourteen separate sources and provided many web links for additional information. On September 29, 2005, MWRA sent a copy of the informational package to EPA, MassDEP, all MWRA water-only member communities, and local watershed associations. Currently this type of information is widely available via the internet.

Specific information on SSOs and backups into homes is provided on the MWRA web site at: http://www.mwra.com/03sewer/html/sso.html. This site includes information on what an SSO is, public health impacts, how SSOs can be prevented, and what MWRA does when an SSO occurs. Links on the site include:

- **DEP's Home Care Guide on Flooding and Sewage Backups;**
- **Cleanup Procedures After a Sewer Backup, from the Boston Water and Sewer Commission; and,**
- **FEMA and Red Cross Guide on Flooded Property Hazards and Repair.**

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.*

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).

Work by MWRA under this Strategy is ongoing.

During FY18, MWRA continued to estimate community infiltration and inflow rates on a bimonthly basis. Community wastewater flow data for CY17 is included as Attachment 6. These flow data tables are available to all users on MWRA's web site. Community wastewater flow rate basis data is distributed to member communities throughout the year on a bimonthly basis. $23.6 million in funds for the next phases of the wastewater meter replacement/upgrade project are programmed in MWRA's Capital Improvement Program during FY18-28.

During FY19, MWRA will continue to estimate community infiltration and inflow rates on a bimonthly basis and make this information available to MWRA member communities. MWRA will provide the information to EPA and MassDEP as part of the annual summary report on actions taken to reduce I/I (submitted annually by September 1 per the NPDES Permit).

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)

Work by MWRA under this Strategy is complete as noted below.

MWRA's Wastewater Meter Replacement project was completed in FY06. The system continues to be used to monitor 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.

During FY18, MWRA began the next Wastewater Metering System upgrade project with a complete review of metering equipment and software technologies, review of MWRA's community metering methodologies, and subsequent design and construction of upgrades. This project is planned for FY18-22 with a budget of over $14.0 million.

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)

Work by MWRA under this Strategy is ongoing.

During FY14 (as of April 25, 2014), MassDEP revised its Regulation 314 CMR 12.00 *Operation, Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers*. The revisions include a requirement for all public entities that own a sewer system to complete an I/I analysis by December 31, 2017. The analysis also must specifically include an assessment of the risk of sewer system overflows.

During FY18, MWRA staff continued to meet with community representatives to provide technical assistance and discuss local programs. Communities are often interested in utilizing MWRA wastewater meter data and flow component analyses for local I/I and SSES studies. Communities also discuss what sewer system rehabilitation actions other communities are pursuing. MWRA's Advisory Board Operation Committee meetings, as well as Wastewater Advisory Committee (WAC) meetings, are used as platforms for member communities to share information on projects and lessons learned. All member sewer communities are actively participating in MWRA's $760.75 million I/I Local Financial Assistance Program (see Attachment 4). Community I/I reduction programs are generally being conducted by local engineering consultants under contract to the communities. These projects generally utilize standards established in MassDEP's May 2017 I/I Guidelines. This work will continue in FY19.

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 EOEA 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)

Work by MWRA under this Strategy is complete as noted below. Some ongoing work performed by MWRA that is associated with this Strategy is also noted. Additional community technical assistance is provided upon request as noted under Strategy C, above.

During FY05, MWRA completed a major upgrade to its electronic sewer database and GIS mapping system. Also during FY05, MWRA completed coordination with local communities to more accurately map connection points of local sewers to the MWRA interceptor system and GPS located all wastewater meter sites. Significant GIS mapping upgrades were rolled-out in FY06. In July 2006, MWRA provided GIS maps with detailed water resource information overlaid with the local sewer system to each MWRA member sewer community. In addition, land use mapping was also distributed to the communities. The distribution of this GIS mapping information fulfilled MWRA's work under Strategy D.

Beginning in FY14 and continuing through FY18, MWRA updated prior (or developed new) GIS mapping information partnership agreements with most MWRA member water and sewer communities to share MWRA/community GIS mapping data. Under the partnership agreements, MWRA and member communities have signed nondisclosure agreements that detail security protocols necessary to safeguard water and sewer system data. MWRA continues to coordinate with member communities to add GIS partners and update existing data. This work will continue in FY19.

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)

Work by MWRA under this Strategy is ongoing.

In June 2004, the MWRA Board of Directors approved an additional $40 million ($18 million in grants and $22 million in interest-free loans) to increase the total I/I Local Financial Assistance Program budget to $180.75 million and extended program distribution through FY13. The additional $40 million (Phase 5) in financial assistance funds became available to the communities in FY05.

In June 2006, the MWRA Board of Directors approved an additional $40 million ($18 million in grants and $22 million in interest-free loans) to increase the total I/I Local Financial Assistance Program budget to $220.75 million and extended program distributions through FY15. The additional $40 million (Phase 6) in financial assistance funds became available to the communities in FY07.

In June 2009, the MWRA Board of Directors approved an additional $40 million ($18 million in grants and $22 million in interest-free loans) to increase the total I/I Local Financial Assistance Program budget to $260.75 million and extended program distributions through FY18. The additional $40 million (Phase 7) in financial assistance funds became available to the communities in FY10.

In June 2012, the MWRA Board of Directors approved an additional $40 million ($18 million in grants and $22 million in interest-free loans) to increase the total I/I Local Financial Assistance Program budget to $300.75 million and extended program distributions through FY21. The additional $40 million (Phase 8) in financial assistance funds became available to the communities in FY13.

In June 2014, the MWRA Board of Directors approved an additional $160 million ($120 million in 75% grants and $40 million in 25% interest-free 10-year loans) to increase the total I/I Local Financial Assistance Program budget to $460.75 million and extended program distributions through FY25. The additional $160 million ($80 million each for Phases 9 and 10) in financial assistance funds became available to the communities in FY15. Note that MWRA has enhanced the Phase 9 and 10 Phases of its grant/loan community funding program by increasing the grant portion from 45% to 75%. Also, the loan portion repayment period has been extended from 5 to 10 years.

In June 2018, the MWRA Board of Directors approved an additional $200 million ($150 million in 75% grants and $50 million in 25% interest-free 10-year loans) to increase the total I/I Local Financial Assistance Program budget to $660.75 million and extended program distributions through FY30. The additional $200 million ($100 million each for Phases 11 and 12) in financial assistance funds became available to the communities in FY19. Also in June 2018, the MWRA Board of Directors approved an additional $100 million 10-year loan only Phase 13 to be used by communities once their grant/loan funds are all distributed. As of FY19, MWRA's commitment to fund local sewer rehabilitation projects under the I/I Local Financial Assistance Program totals $760.75 million.

During FY18, MWRA continued to provide grants and loans to member sewer communities to fund local I/I reduction and sewer system rehabilitation projects. A total of $21.7 million was distributed during FY18. Since program inception in May 1993, $354 million has been distributed to fund 545 local projects. The program Guidelines, Financial Assistance Application, and summary of available funds by community are posted on the MWRA Community Support Program web page at http://www.mwra.com/comsupport/communitysupportmain.html. A status update on MWRA's I/I Local Financial Assistance Program is included as Attachment 4.

During FY19, MWRA will continue to distribute funds and assist communities in the management of projects under the I/I Local Financial Assistance Program. MWRA's remaining financial assistance funds are authorized for distribution through FY30.

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)

Work by MWRA under this Strategy is ongoing.

During FY18, MWRA continued to provide emergency assistance to member communities, as requested. These efforts typically included internal TV inspection of local sewers and associated sewer cleaning, as well as, other emergency assistance. During FY19, MWRA will continue to provide emergency assistance to member communities.

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.*

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)

Work by MWRA under this Strategy is ongoing including information on both wastewater and water systems.

During FY18, MWRA distributed technical information to member community Public Works Directors, City/Town Engineers, local wastewater/water system operators, community consultants, and local watershed groups, including:

- **MWRA continued to estimate community infiltration and inflow rates on a bimonthly basis. Community wastewater flow data for CY17 is included as Attachment 6. These flow data tables are available to all users on MWRA's web site. Community wastewater flow rate basis data is distributed to member communities throughout the year on a bimonthly basis. $23.6 million in funds for the next phase of the wastewater meter replacement/upgrade project are programmed in MWRA's Capital Improvement Program during FY18-28.**

- **In October and December 2017, and again in January, March and May 2018, MWRA staff provided correspondence to the communities that had not yet applied for their Phase 6 I/I Local Financial Assistance Program grant/loan funds. The letters notified the communities that the grant portion of the financial assistance "sunsets" at the end of FY18.**

- **October 6, 2017, MWRA staff provided an update presentation on the I/I Local Financial Assistance Program to the MWRA Wastewater Advisory Committee.**

- **February 22, 2018, MWRA staff provided an update presentation on the Wastewater Meter Replacement Project and the I/I Local Financial Assistance Program to the MWRA Advisory Board Operations Committee and community representatives.**

- **March 5, 2018, MWRA staff distributed an announcement letter on water conservation educational materials and low-flow device retrofit kits available from MWRA at no cost to member communities, local customers, watershed associations, environmental groups, housing authorities, condo associations, etc.**

- **March 21, 2018, MWRA staff provided an update presentation on the I/I Local Financial Assistance Program to the MWRA Board of Directors. All Staff Summaries to the MWRA Board of Directors are posted on MWRA web site at www.mwra.com.**

- **March 21, 2018, MWRA staff provided an update presentation on the Local Water System Assistance Program to the MWRA Board of Directors. All Staff Summaries to the MWRA Board of Directors are posted on MWRA web site at www.mwra.com.**

- **March 22, 2018, MWRA staff distributed correspondence to all sewer communities with an update on funds available under the I/I Local Financial Assistance Program (grant/loan funds) and requested information on the community's projected three year spending plan.**

- **March 28, 2018, Local Water System Assistance Program funding (interest-free 10-year loans) update e-mails were distributed to each member community and information on AWWA's Lead Service Line Replacement Standard was included.**

- **May 17, 2018, MWRA staff provided an update presentation on the I/I Local Financial Assistance Program to the MWRA Advisory Board and community representatives.**

- **Early-July 2018, annual community I/I questionnaires were distributed to member sewer communities to acquire information on FY18 local I/I reduction programs for development of MWRA's Annual I/I Reduction Report (see Attachment 5).**

- **July 11, 2018, MWRA staff distributed correspondence to all sewer communities announcing the MWRA's $300 million Phase 11, 12, and 13 expansions of the I/I Local Financial Assistance Program with a link to the MWRA Community Support Web page for more information.**

- **July 18, 2018, MWRA Board of Directors approved the staff summary recommendation to extend the sunset date for Malden's Phase 6 grant allocation six months to December 30, 2018. All Staff Summaries to the MWRA Board of Directors are posted on MWRA web site at www.mwra.com.**

During FY19, MWRA will continue to distribute information on I/I and SSO issues, as appropriate.

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)

Work by MWRA under this Strategy is complete as noted below.

On August 8, 2007, MWRA distributed a Technical Transfer Summary package that included lists of previously distributed information under five separate topic headings: (1) Reports, Handbooks, and Guidelines; (2) Sewer Back-ups, SSOs, and Flooding; (3) Public Source I/I Reduction; (4) Private Source I/I Reduction; and (5) Brochures and Bill Stuffers. Additional information/technology distributions will continue under Strategy A, above.

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)

Work by MWRA under this Strategy is ongoing. Following-up on the joint workshop in 2001, additional joint workshops were held in 2002 and 2004.

On April 27, 2011, representatives from MassDEP, EPA, and MWRA met to discuss I/I reduction in the region. The potential for future workshops was noted, but no specific plans have been developed for organizing additional joint workshops.

During FY14 (as of April 25, 2014), MassDEP revised its Regulation 314 CMR 12.00 *Operation, Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers*. The revisions included a requirement for all public entities that own a sewer system to complete an I/I analysis by December 31, 2017. The analysis also must specifically include an assessment of the risk of sewer system overflows.

During FY17 (as of May 2017), MassDEP revised its *Guidelines for Performing Infiltration/Inflow Analyses and Sewer System Evaluation Surveys*.

On October 6, 2017, both MassDEP and MWRA staff provided an update presentations and had discussions with the MWRA Wastewater Advisory Committee.

On November 29, 2017, staff from USEPA, MassDEP, and MWRA met to discuss mutual areas of interest regarding wastewater metering and I/I reduction programs.

On an annual basis, MWRA staff provided an update presentation to the MWRA Board of Directors on both I/I Local Financial Assistance and Local Water System Assistance Programs.

Periodically, MWRA staff provided update presentations to the MWRA Advisory Board and member community representatives, as well as the Wastewater Advisory Committee

and Water Supply Citizens Advisory Committee, on a variety of related topics including: I/I Local Financial Assistance Program, Local Water System Assistance Program, Lead Service Line Replacement Loan Program, water and wastewater metering, water and wastewater flow data, rate assessment methodologies, water and wastewater permitting and regulations, etc. See the list of technical information noted in Strategy A, above.

During FY19, MWRA will continue to work cooperatively with MassDEP on this strategy.

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)

Work by MWRA under this Strategy is complete as noted below.

MWRA distributed the Fat-Free Sewers brochure to wastewater system operators in July 2003. In conjunction with the Technical Transfer Summary package distributed on August 8, 2007 (see Strategy B, above), MWRA included a separate topic heading for "Brochures and Bill Stuffers" that can be used by local communities as educational materials. Links to educational materials are provided on www.mwra.com.

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)

Work by MWRA under this Strategy is complete as noted below.

As part of the Technical Transfer Summary package distributed on August 8, 2007 (see Strategy B, above), MWRA included a separate topic heading specifically for "Brochures and Bill Stuffers" that can be used by local communities as educational materials. There are sufficient example brochures available so that no additional work is needed under this strategy. Communities actively involved with private inflow removal programs have generally been using available sample brochures and other public education materials to develop public education information related to their specific project. Information already available via local engineering consultants is also utilized.

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)

Work by MWRA under this Strategy is complete as noted below.

Local communities, state agencies, regional associations, etc. all maintain their own web pages with numerous information links. MWRA's web site contains links to the communities' web sites and links to other organizations. Based on current broad use of the web, additional work under this strategy is not needed. MWRA continues to revise and upgraded its web site www.mwra.com and the Community Support Program page: http://www.mwra.com/comsupport/communitysupportmain.html.

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)

Work by MWRA under this Strategy is ongoing. The focus of MWRA's School Education Program is to provide a general understanding of water and wastewater transport and treatment systems with emphasis on water conservation and environmental awareness issues. Educational materials are designed for students from elementary to high school levels.

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)

Work by MWRA under this Strategy is ongoing. During FY18, no assistance from MWRA was requested by MassDEP. Any future action under this strategy will be initiated jointly with MassDEP.

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)

Work by MWRA under this Strategy is ongoing. During FY18, no assistance from MWRA was requested under this strategy.

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.*

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.

Work by MWRA under this Strategy is complete as noted below.

MWRA provided all member communities and all interested parties copies of the I/I Task Force Report in April 2001, shortly after the Report was completed. MWRA continues to maintain a supply of I/I Task Force Reports and provides additional copies to MWRA member communities and regional stakeholders, as requested. In July 2003, all member communities were provided a copy of the MWRA Regional I/I Reduction Plan. Both the I/I Task Force Report and MWRA Regional I/I Reduction plan are posted on MWRA's Community Support Program web page at: http://www.mwra.com/comsupport/communitysupportmain.html.

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)

Work by MWRA under this Strategy is complete as noted below.

MWRA did not proceed with work under this strategy pending issuance of EPA's SSO Rule, including CMOM Regulations, that were likely to impact local sewer use regulations. EPA's draft SSO Rule was not promulgated. During FY04, MassDEP distributed a new guideline document – "Optimizing Operation, Maintenance and Rehabilitation of Sanitary Sewer Collection Systems" dated August 2003. This manual was developed by New England Interstate Water Pollution Control Commission (NEIWPCC) under a grant from EPA. The Guideline Document was written by a committee consisting of NEIWPCC member state environmental agencies, EPA, and wastewater consultants. The manual is available at www.neiwpcc.org. Chapter 4 of the manual "Optimizing Legal Authority" includes sections on Sewer Use Ordinances; therefore, additional work by MWRA under this strategy is not necessary. Web links to information provided by MassDEP, USEPA, and NEIWPCC are posted on MWRA's Community Support Program web page at: http://www.mwra.com/comsupport/communitysupportmain.html.

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.

Work by MWRA under this Strategy is complete as noted below.

A Member Community Collection System Operation and Maintenance Manual Guidance Document and Overflow Response Plan was developed and submitted to EPA and MassDEP for review in June 2001. This guidance document was made available to member communities. During FY04, MassDEP distributed a new guideline document – "*Optimizing Operation, Maintenance and Rehabilitation of Sanitary Sewer Collection Systems*" dated August 2003. This manual was developed by New England Interstate Water Pollution Control Commission (NEIWPCC) under a grant from EPA. It was written by a committee consisting of NEIWPCC member state environmental agencies, EPA, and wastewater consultants. The manual is available at www.neiwpcc.org. MWRA provided its collection system O&M manual and the community collection system guidance document to the NEIWPCC committee for review. With the publication of the NEIWPCC manual, further efforts on the Member Community Collection System Operation and Maintenance Manual Guidance Document are not required.

During FY14 (as of April 25, 2014), MassDEP revised its Regulation 314 CMR 12.00 *Operation, Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers*.

During FY17 (as of May 2017), MassDEP revised its *Guidelines for Performing Infiltration/Inflow Analyses and Sewer System Evaluation Surveys*.

ATTACHMENT 3
TO
MWRA ANNUAL I/I REDUCTION REPORT FOR FY18
Reporting Period – July 2017 Through June 2018

MWRA ACTIONS TAKEN TO REDUCE I/I DURING FY18

The MWRA Field Operations Department's Technical Inspection program staff have internally inspected approximately 33 miles of Authority-owned interceptors and 1,200 feet of community-owned sewers, internally inspected 50 inverted siphon barrels with sonar inspection equipment, and physically inspected 750 sewer manholes and other structures (diversion chambers, siphon headhouses, tide gates, etc.) during FY18. During the internal inspection process, problems such as physical defects, manhole frame and cover defects, infiltration/inflow, sediment, grease deposits, etc. are noted and stored in MWRA's electronic maintenance (MAXIMO) database. Maintenance work is then scheduled based on the identified problems.

During FY18, MWRA's maintenance work included hydraulic/mechanical cleaning of 36 miles of Authority-owned sewers, 1200 feet of community-owned sewers, cleaning of 72 siphon barrels, and replacement of 175 manhole frames and covers. In addition, 76 sewer manholes were rehabilitated via cement mortar lining under MWRA's annual manhole rehabilitation contract. Potential structural problems and infiltration sources identified during the inspection process are referred to engineering staff for follow-up review and analysis of cost-effective repairs.

The MWRA is undertaking a number of significant capital projects to rehabilitate portions of Authority-owned interceptors and provide additional hydraulic capacity. Updates on these projects are included below:

1. During FY18, MWRA continued rehabilitation of sewer interceptors under the Interceptor Renewal/Asset Protection Program. Evaluation and design of interceptor rehabilitation began in FY09. The program includes a series of twelve interceptor renewal projects to be phased over multiple years at a cost of over $150 million. Each of these projects will provide structural repairs for existing pipelines and reduce I/I entering the MWRA interceptor system. MWRA's Interceptor Renewal/Asset Protection Projects #1 through #7 for rehabilitation construction of a variety of Sewer Sections are programmed in the FY18 CIP at a cost of $125 million. Interceptor Renewal/Asset Protection Projects #1 through #7 include:

    - Interceptor Renewal/Asset Protection Project #1: rehabilitation design and construction of 12,240 linear feet of the Reading Extension Sewer Sections 75, 74, 73, primarily in Stoneham, with short reaches in Wakefield and Woburn. Approximately 1,400 linear feet of Reading Extension Sewer Section 74 were CIPP lined in the mid 1990's. Also, included is rehabilitation of 2,280 linear feet of Metropolitan Sewer Section 46 in Stoneham, as well as, rehabilitation of 62 manholes and structures along the pipeline route. Design for this project is complete and construction began in FY17. Total design, construction, and construction services costs will be approximately $3.2 million.

- Interceptor Renewal/Asset Protection Project #2: rehabilitation design and construction of Section 4, 5, 6 and 186 on the North Metropolitan Sewer in Winthrop and just upstream of the Deer Island Treatment Plant will include rehabilitation of about 5,300 feet of 108-inch brick sewer. Portions of this sewer was previously rehabilitated using a shotcrete process in the 1990s. A preliminary design study for this project began in FY17 with an overall design, construction, and construction services cost estimate of $10.2 million.

- Interceptor Renewal/Asset Protection Project #3: rehabilitation design and construction of the Dorchester Interceptor Sewer Sections 240, 241, and 242. Design for this project will began in FY18 with an overall design, construction and construction services cost estimate of $7.1 million.

- Interceptor Renewal/Asset Protection Project #4A: Rehabilitation design and construction of the Cambridge Branch Sewer Sections 27 and 26 in Charlestown, Somerville, and Cambridge. A preliminary design study for Cambridge Branch Sewer Sections 23 – 24 and 26 – 27 began in FY17.

- Interceptor Renewal/Asset Protection Project #4B: Rehabilitation design and construction of the Cambridge Branch Sewer Sections 23 and 24 in Everett and Charlestown. A preliminary design study for Cambridge Branch Sewer Sections 23 – 24 and 26 – 27 began in FY17.

- Interceptor Renewal/Asset Protection Project #5: Rehabilitation design and construction of portions of Sections 607, 609, and 610 in Milton.

- Interceptor Renewal/Asset Protection Project #6: Rehabilitation design and construction of portions of Sections 12, 14, 15, and 62 in Chelsea.

- Interceptor Renewal/Asset Protection Project #7: Rehabilitation design and construction of portions of Sections 41, 42, 49, 54 and 65 in Melrose and Malden.

ATTACHMENT 4
TO
MWRA ANNUAL I/I REDUCTION REPORT FOR FY18
Reporting Period: July 2017 Through June 2018

STATUS UPDATE ON MWRA's I/I LOCAL FINANCIAL ASSISTANCE PROGRAM

Financial Assistance Update

All 43-member sewer communities are participating in MWRA's $760.75 million Infiltration/Inflow (I/I) Local Financial Assistance (grant/loan) Program. The program began in May 1993 and, through FY18, $354 million has been distributed to fund 545 local I/I reduction and sewer system rehabilitation projects. The program budget of $760.75 million includes the most recent addition of $300 million approved by the MWRA Board of Directors for distribution beginning in FY19, including: Phase 11 ($100 million in grant/loan funds), Phase 12 ($100 million in grant/loan funds), and Phase 13 ($100 million in loan only funds). For new Phases 11 and 12, the grant component remains as 75% of the eligible project costs. The table on page 2 provides a summary of funding allocations, distributions, and funds remaining for each MWRA sewer community. Distribution of grant and loan financial assistance to member communities has been approved through FY30. The table on page 3 provides a summary of funding distributions by fiscal quarter since Program inception.

Program Background

MWRA's I/I Local Financial Assistance Program was initiated to provide funding to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned collection systems. Following recommendations from the MWRA Advisory Board, the MWRA Board of Directors has approved a total program budget of $760.75 million. The funds have been allocated among the 43 MWRA sewer communities based on respective share of MWRA's wholesale sewer charge. Financial assistance for Phases 1 and 2 (total of $63.75 million) was distributed for approved projects as a 25 percent grant and a 75 percent interest-free loan. The grant/loan split was revised for distribution of the Phase 3 through 8 funds (total of $237 million) to a 45 percent grant and a 55 percent interest-free loan. The interest-free loan portion for Program Phases 1 through 8 has been repaid to MWRA over a five-year period beginning one year after the date the funds are distributed. The grant/loan split was again enhanced for distribution of Phases 9 through 12 funds (total of $360 million) to a 75 percent grant and a 25 percent interest-free loan. The interest-free loan repayment period for Program Phases 9 through 12 has been extended to ten years from the previous five (again beginning one year after the date the funds are distributed). Phase 13 is a $100 million loan-only Phase also with a ten-year repayment.

MWRA funding is provided to a community following execution of a standard agreement that stipulates the project scope, schedule, and loan repayment requirements. Communities are required to provide periodic schedule and expenditure progress reports to MWRA. For planning and design projects, the work products (reports, plans, specifications, and bidding documents) are reviewed and approved by MWRA. During construction, MWRA staff perform site visits to document progress.

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM
FUNDING SUMMARY AS OF JULY 2018

Community	Total Allocations (Phases 1 - 13)	Total Distributions (Phases 1 - 13)	Percent Distributed	Funds Remaining
Arlington	$13,703,000	$8,423,000	61%	$5,280,000
Ashland	$3,818,500	$1,742,450	46%	$2,076,050
Bedford	$5,654,600	$1,999,600	35%	$3,655,000
Belmont	$8,255,100	$2,992,100	36%	$5,263,000
Boston	$218,001,200	$92,678,406	43%	$125,322,794
Braintree	$14,419,000	$7,480,800	52%	$6,938,200
Brookline	$21,355,200	$7,666,200	36%	$13,689,000
Burlington	$8,432,800	$5,102,800	61%	$3,330,000
Cambridge	$39,250,100	$17,579,600	45%	$21,670,500
Canton	$6,635,900	$2,675,900	40%	$3,960,000
Chelsea	$11,760,100	$5,551,100	47%	$6,209,000
Dedham	$9,220,000	$5,740,000	62%	$3,480,000
Everett	$13,381,500	$6,650,500	50%	$6,731,000
Framingham	$20,375,000	$7,255,910	36%	$13,119,090
Hingham	$2,802,500	$1,632,500	58%	$1,170,000
Holbrook	$2,779,600	$896,562	32%	$1,883,038
Lexington	$12,125,300	$7,445,300	61%	$4,680,000
Malden	$20,683,900	$4,593,900	22%	$16,090,000
Medford	$19,637,600	$7,961,600	41%	$11,676,000
Melrose	$10,126,300	$6,076,300	60%	$4,050,000
Milton	$9,014,500	$4,650,500	52%	$4,364,000
Natick	$9,332,600	$4,613,600	49%	$4,719,000
Needham	$9,977,600	$3,218,600	32%	$6,759,000
Newton	$34,937,400	$21,197,400	61%	$13,740,000
Norwood	$11,589,400	$6,879,400	59%	$4,710,000
Quincy	$32,780,000	$19,656,000	60%	$13,124,000
Randolph	$10,070,800	$3,894,800	39%	$6,176,000
Reading	$7,749,100	$4,629,100	60%	$3,120,000
Revere	$16,940,900	$5,502,900	32%	$11,438,000
Somerville	$25,955,800	$10,117,800	39%	$15,838,000
Stoneham	$7,829,900	$4,919,900	63%	$2,910,000
Stoughton	$7,902,900	$4,722,900	60%	$3,180,000
Wakefield	$9,806,900	$5,966,900	61%	$3,840,000
Walpole	$6,110,000	$3,042,000	50%	$3,068,000
Waltham	$22,282,400	$11,377,400	51%	$10,905,000
Watertown	$10,155,800	$4,185,800	41%	$5,970,000
Wellesley	$9,249,700	$3,582,504	39%	$5,667,196
Westwood	$4,302,300	$2,091,300	49%	$2,211,000
Weymouth	$19,100,900	$8,635,900	45%	$10,465,000
Wilmington	$4,232,000	$1,606,000	38%	$2,626,000
Winchester	$6,793,000	$4,183,000	62%	$2,610,000
Winthrop	$5,553,400	$2,807,400	51%	$2,746,000
Woburn	$16,665,500	$10,695,500	64%	$5,970,000
Totals	$760,750,000	$354,321,132	47%	$406,428,868

MWRA I/I Local Financial Assistance Program - Fiscal Year Breakdown

FY	Distribution Cycle	Distribution Amount	Distribution Cycle	Distribution Amount	Distribution Cycle	Distribution Amount	Distribution Cycle	Distribution Amount	FY Total
FY93	Aug 1992	$0	Nov 1992	$0	Feb 1993	$0	May 1993	$2,714,883	$2,714,883
FY94	Aug 1993	$3,096,468	Nov 1993	$4,096,133	Feb 1994	$3,191,032	May 1994	$251,494	$10,635,127
FY95	Aug 1994	$354,126	Nov 1994	$976,700	Feb 1995	$1,894,030	May 1995	$6,489,891	$9,714,747
FY96	Aug 1995	$0	Nov 1995	$504,100	Feb 1996	$2,921,600	May 1996	$3,902,426	$7,328,126
FY97	Aug 1996	$1,682,061	Nov 1996	$1,581,266	Feb 1997	$395,100	May 1997	$3,530,758	$7,189,185
FY98	Aug 1997	$1,066,300	Nov 1997	$1,157,260	Feb 1998	$909,350	May 1998	$2,001,608	$5,134,518
FY99	Aug 1998	$1,521,100	Nov 1998	$2,464,263	Feb 1999	$1,481,700	May 1999	$5,758,077	$11,225,140
FY00	Aug 1999	$1,315,767	Nov 1999	$1,847,900	Feb 2000	$1,679,000	May 2000	$1,070,100	$5,912,767
FY01	Aug 2000	$1,148,400	Nov 2000	$388,000	Feb 2001	$1,640,931	May 2001	$804,800	$3,982,131
FY02	Aug 2001	$4,480,735	Nov 2001	$704,040	Feb 2002	$1,804,200	May 2002	$5,002,691	$11,991,666
FY03	Aug 2002	$1,962,600	Nov 2002	$4,461,768	Feb 2003	$7,955,752	May 2003	$1,836,600	$16,216,720
FY04	Aug 2003	$2,021,940	Nov 2003	$1,306,200	Feb 2004	$1,770,760	May 2004	$3,295,400	$8,394,300
FY05	Aug 2004	$2,756,659	Nov 2004	$6,013,436	Feb 2005	$4,054,060	May 2005	$2,636,700	$15,460,855
FY06	Aug 2005	$5,377,487	Nov 2005	$4,589,600	Feb 2006	$1,519,463	May 2006	$6,489,676	$17,976,226
FY07	Aug 2006	$0	Nov 2006	$4,947,414	Feb 2007	$8,789,300	May 2007	$8,121,023	$21,857,737
FY08	Aug 2007	$3,915,500	Nov 2007	$4,355,750	Feb 2008	$1,392,400	May 2008	$4,436,600	$14,100,250
FY09	Aug 2008	$4,196,399	Nov 2008	$352,000	Feb 2009	$1,990,300	May 2009	$4,872,400	$11,411,099
FY10	Aug 2009	$5,462,736	Nov 2009	$616,600	Feb 2010	$2,679,600	May 2010	$4,845,000	$13,603,936
FY11	Aug 2010	$723,700	Nov 2010	$3,183,250	Feb 2011	$4,123,100	May 2011	$4,258,900	$12,288,950
FY12	Aug 2011	$3,695,100	Nov 2011	$2,417,378	Feb 2012	$848,300	May 2012	$7,010,324	$13,971,102
FY13	Aug 2012	$21,299,965	Nov 2012	$1,004,610	Feb 2013	$2,460,000	May 2013	$2,675,000	$27,439,575
FY14	Aug 2013	$7,550,310	Nov 2013	$0	Feb 2014	$2,929,700	May 2014	$2,271,852	$12,751,862
FY15	Aug 2014	$4,053,000	Nov 2014	$7,647,400	Feb 2015	$10,128,648	May 2015	$4,803,450	$26,632,498
FY16	Aug 2015	$3,983,100	Nov 2015	$5,783,000	Feb 2016	$7,195,116	May 2016	$5,483,000	$22,444,216
FY17	Aug 2016	$2,352,100	Nov 2016	$6,553,210	Feb 2017	$2,918,900	May 2017	$10,434,030	$22,258,240
FY18	Aug 2017	$8,085,900	Nov 2017	$10,311,545	Feb 2018	$1,377,800	May 2018	$1,909,730	$21,684,975
Total		$92,101,453		$77,262,823		$78,050,142		$106,906,713	$354,321,132

Program Goals

The I/I Local Financial Assistance Program is a critical component of MWRA's Regional I/I Reduction Plan. Specifically, local sewer system rehabilitation projects are intended to at least offset ongoing collection system deterioration to prevent a net increase in regional I/I. In the long-term, system rehabilitation should result in lower I/I, which will allow for future increases in sanitary (residential, commercial, industrial, and institutional) flow without a net increase in total wastewater flow to the Deer Island Treatment Plant.

A second goal of the program is to assist member communities in implementing effective annual local collection system maintenance programs to assure efficient operation and ongoing collection system repair/replacement.

Type of Local Projects Receiving Funding

Funding has been provided to local communities for eligible I/I reduction projects including planning, design, construction, and engineering services during construction. These projects generally take one to three years to complete. Seventy-seven percent of funds distributed to date have financed local construction projects. The table below details funds distributed by project phase for both completed and ongoing projects.

PROJECT PHASE	COMPLETE PROJECTS ($ millions)	ONGOING PROJECTS ($ millions)	TOTAL ($ millions)
Planning/Study:	$ 40.8	$ 6.5	$ 47.3 (14%)
Design:	12.8	2.5	15.3 (4%)
Construction:	220.6	52.3	272.9 (77%)
Eng. Services During Const.:	14.3	4.5	18.8 (5%)
TOTAL	$ 288.5 (81%)	$ 65.8 (19%)	$ 354.3 (100%)

Program Results

The I/I Local Financial Assistance Program began in May 1993. Through FY18, a total of 545 local I/I reduction and sewer system rehabilitation projects have been funded through the MWRA's grant/loan program. Cumulative results for the program are summarized below.

Results for all projects (FY93 through FY18) for planning/inspection include the following:

- 1,957 miles of sewer TV inspected
- 1,392 miles of sewer flow isolated
- 1,308 miles of sewer smoke tested
- 56,223 sewer manholes inspected
- 77,894 buildings inspected

Results for all projects (FY93 through FY18) targeting infiltration reduction include the following:

- 60 miles sewer replaced
- 193 miles sewer CIPP lined
- 162 miles sewer tested/chemically sealed
- 2,435 sewer spot repairs
- 12,675 service connection repairs
- 4.8 miles underdrains sealed

Results for all projects (FY93 through FY18) targeting inflow reduction include the following:

- 1,060 catch basins disconnected
- 44 miles of new or replaced storm drains
- 17,014 manholes rehabilitated/sealed
- 3,111 manhole covers replaced or inflow seals installed
- 433 sump pumps redirected
- 5,292 downspouts/area drains disconnected

Stormwater and Infiltration/Inflow Impacts to the Collection System

Wastewater discharged by member sewer communities to MWRA is influenced by seasonal and wet-weather conditions related to stormwater in combined sewer systems, groundwater infiltration, and stormwater and tidal inflow. Infiltration/Inflow (I/I) is extraneous water that enters all wastewater collection systems through a variety of sources.

Infiltration is groundwater that enters the collection system through physical defects such as cracked pipes/manholes or deteriorated joints. Typically, many sewer pipes and sewer service laterals are below the surrounding groundwater table. Therefore, leakage into the sewer (infiltration) is a broad problem that is difficult and expensive to identify and reduce.

Inflow is extraneous flow entering the collection system through point sources and may be directly related to storm water run-off from sources such as roof leaders, yard and area drains, basement sump pumps, manhole covers, cross connections from storm drains or catch basins, leaking tide gates, etc. Inflow causes a rapid increase in wastewater flow that occurs during and after storms. The volume of inflow entering a collection system typically depends on the magnitude and duration of a storm event, as well as related impacts such as snowmelt and storm tides.

Inflow into a Manhole

Stormwater in Combined Sewers is, by design, collected in the combined sewer system to be transported to a downstream treatment facility. Additional system capacity is available via combined sewer overflow (CSO) storage facilities and outfalls that may be active during rainfall events.

Regional Wastewater Flow Trends

Wastewater Flow Graph 1 (page 7) provides long-term regional flow data for the Deer Island Treatment Plant collection system and annual rainfall. The long-term average daily flow for the total system is about 353 mgd (last 29 years) and the average annual rainfall is 43 inches (Boston Logan Airport Data). Wastewater Flow Graph 2 (page 8) shows the five-year running averages (flow and rainfall) as a means of smoothing the annual variability in the long-term data displayed in Wastewater Flow Graph 1. The five-year running average daily flow has declined from approximately 390 mgd to approximately 300 mgd, a reduction of 90 mgd or 23% of wastewater

flow tributary to the Deer Island Treatment Plant.

During dry summer months, total system minimum flows drop to as low as 220 mgd. Few problems exist within local and regional sewer systems during dry weather or as a result of small and medium storm events. In contract, peak wet-weather flow during occasional significant rainfall exceeds the 1,270 mgd plant capacity, more than 3.5 times the average flow. The collection system has additional capacity available at combined sewer overflow (CSO) storage facilities and outfalls. Extreme storm events that occur during periods of high groundwater, may cause sewer system surcharging and sanitary sewer overflows (SSOs).

Over the last five years (2013-2017), MWRA's average daily flow of 300 mgd has been about 15 percent below the long-term average of 353 mgd. The five-year average rainfall of 39 inches has been about 9% below the long-term average of 43 inches.

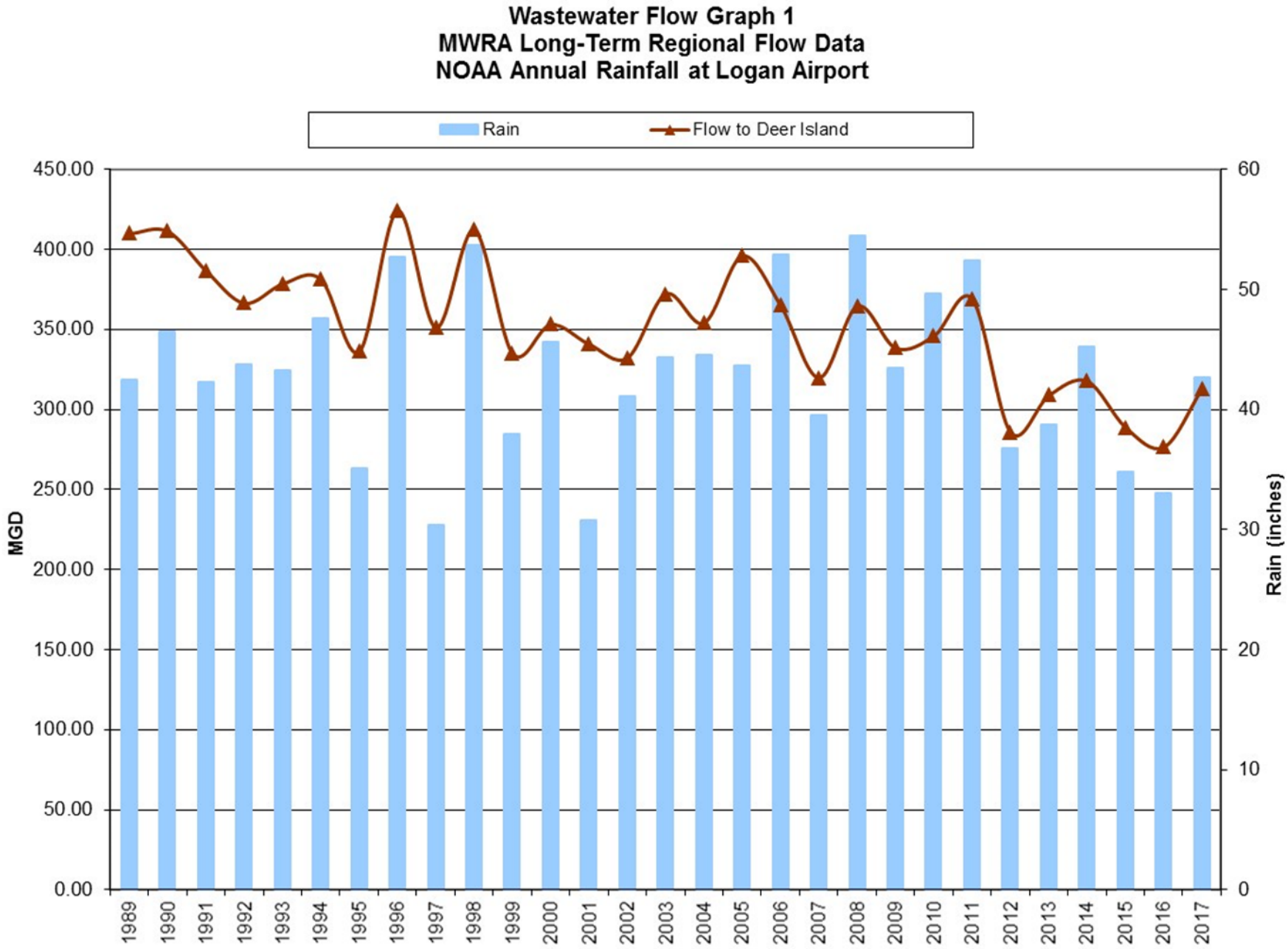
The estimated average daily flow reduction associated with completed local I/I reduction projects that have received MWRA financial assistance is about 90 million gallons per day (mgd). This flow reduction "ballpark" figure is based on the communities' (or their consultants') peak I/I reduction estimates, which have been prorated by MWRA staff to estimate an annual average I/I reduction. The estimated I/I reduction represents groundwater and stormwater that no longer enter the collection system at the point of sewer repair. Regional wastewater flow trends are influenced by many factors, including:

- MWRA's numerous pumping and interceptor upgrades, as well as combined sewer overflow and system optimization projects, result in an increase in the capture and treatment of wastewater flow and the reduction of raw sewage discharges. When reviewing end-of-the-collection system meter data, these increased flows to the Deer Island Treatment Plant offset upstream I/I reductions;

- Wastewater flows within the collection system vary dramatically due to changes in precipitation. For example, annual average daily flow for MWRA's system varies up to 100 mgd from year to year (from a low of less than 300 mgd to a high of more than 400 mgd). Small flow reductions for individual projects are dwarfed by regional flow fluctuations;

- Sewer capacity gained by elimination of I/I in one subsystem may allow additional I/I to enter the collection system at a different location (known as infiltration migration), resulting in less net flow reduction at the end of the collection system; and,

- In the MWRA service area over the last 20 years, the increase in wastewater flow from increased sewered population is generally offset by the decline in per capita indoor water use.


Wastewater Flow Graph 1
MWRA Long-Term Regional Flow Data
NOAA Annual Rainfall at Logan Airport
Rain
Flow to Deer Island
MGD
Rain (inches)
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
60
50
40
30
20
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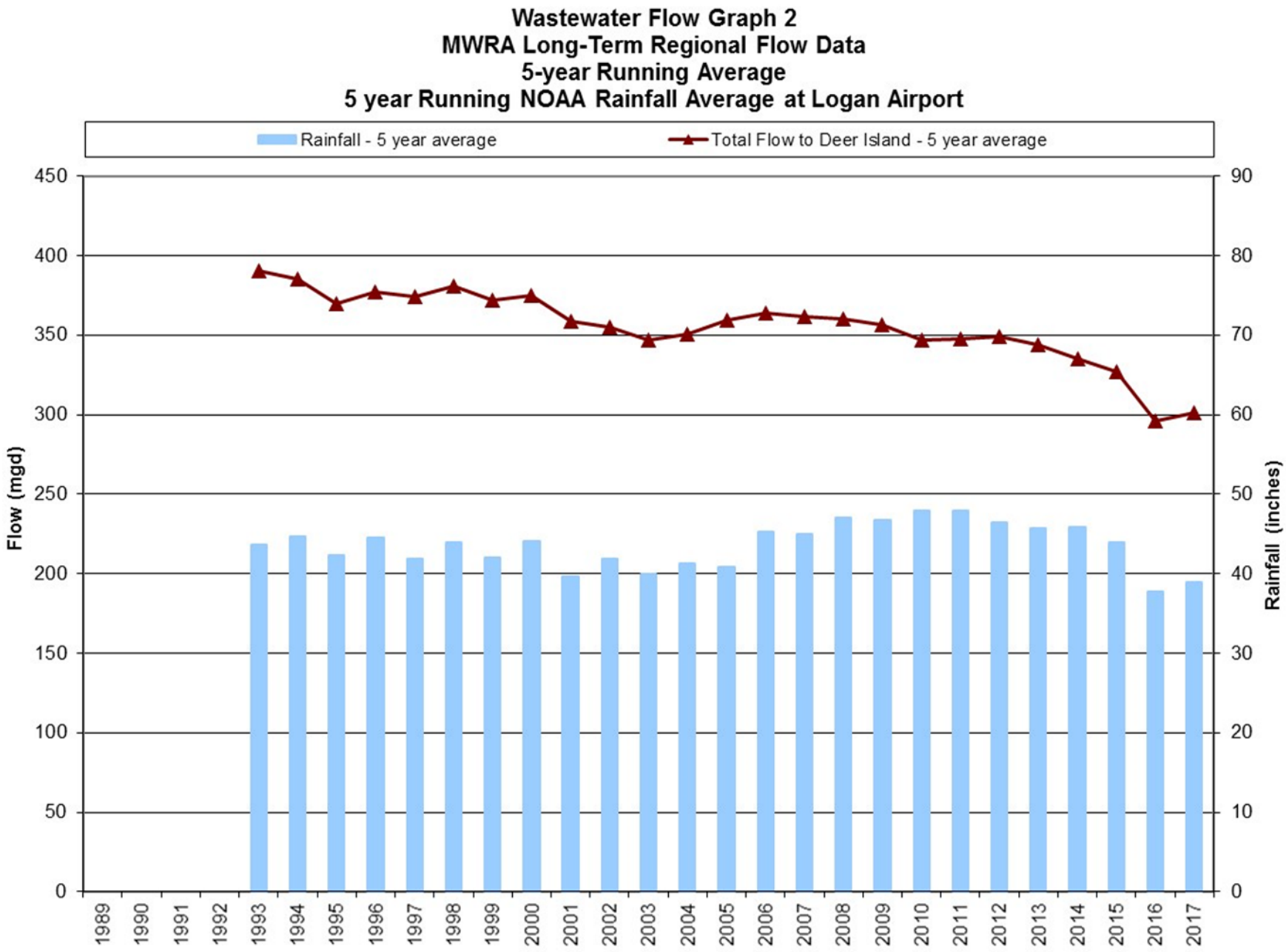
Wastewater Flow Graph 2
MWRA Long-Term Regional Flow Data
5-year Running Average
5 year Running NOAA Rainfall Average at Logan Airport
Rainfall - 5 year average
Total Flow to Deer Island - 5 year average
Flow (mgd)
Rainfall (inches)
450
400
350
300
250
200
150
100
50
0
90
80
70
60
50
40
30
20
10
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2017

Community Projects Funded During FY18

During FY18, MWRA distributed a total of $21.7 million in grants and loans to member communities to help fund 17 local I/I reduction projects. Community projects are funded quarterly under the MWRA I/I Local Financial Assistance Program. Attached (following this page) are funding summaries for the four quarterly funding distributions during FY18:

- First Quarter FY18 - August 2017 Funding Cycle with $8,085,900 distributed to five communities: Milton, Norwood, Quincy, Reading, and Winchester;

- Second Quarter FY18 - November 2017 Funding Cycle with $10,311,545 distributed to five communities: Braintree, Cambridge, Melrose, Weymouth, and Woburn;

- Third Quarter FY18 - February 2018 Funding Cycle with $1,377,800 distributed to three communities: Braintree, Stoughton, and Watertown; and,

- Fourth Quarter - May 2018 Funding Cycle with $1,909,730 distributed to four communities: Arlington, Medford, Needham, and Wellesley.

MWRA I/I Local Financial Assistance Program Funding Summary

August 2017 Funding Cycle

Community	Funding Allocation
Milton	$ 914,000
Norwood	$ 2,360,000
Quincy	$ 3,320,000
Reading	$ 844,000
Winchester	$ 647,900
Total	$ 8,085,900

Massachusetts Water Resources Authority - I/I Local Financial Assistance Program

August 2017 Funding Distribution (Phase 9 - 13th Funding Cycle)

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21-Sep-17

Community	MWRA Financial Asst. Project Number	Total Funds Remaining	August 2017 Funding Allocation	August 2017 Grant Portion	August 2017 Loan Portion	Funding Distribution
Milton	WRA-P9-21-3-972	$1,828,000	$914,000	$685,500	$228,500	Phase 9
Norwood	WRA-P9-25-3-974	$2,360,000	$2,360,000	$1,770,000	$590,000	Phase 9 / 10
Quincy	WRA-P9-26-3-971	$3,454,000	$3,320,000	$2,490,000	$830,000	Phase 10
Reading	WRA-P9-28-3-970	$844,000	$844,000	$633,000	$211,000	Phase 10
Winchester	WRA-P9-41-3-973	$647,900	$647,900	$485,925	$161,975	Phase 10
		Total	$8,085,900	$6,064,425	$2,021,475	

Total Projects Funded To Date	Total Allocations (Phases 1 - 10)	Total Distributions (Phases 1 - 10)	Funds Remaining
533	$460,750,000	$340,722,056	$120,027,944

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

TOWN OF MILTON, MASSACHUSETTS
YEAR 12 INFILTRATION REHABILITATION - DESIGN / CONSTRUCTION
YEAR 13 I/I INVESTIGATION AND REPORTING - STUDY
MWRA PROJECT NO. WRA-P9-21-3-972

SCOPE OF SERVICES

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. The project area includes Milton Subareas G-02A / G-03A / G-03B / G-03C / G-03D / G-09 / G-10A / G-16 / G-17 / G-19 / G-20 / S-01 / S-01A / S-07B / S-07D / S-08. Project work will include, but not be limited to, the following:

1. **Year 12 Infiltration Rehabilitation Design:** Design cost-effective and value-effective sewer rehabilitations in Subareas G-02A / G-03B / G-03D / G-09 / G-10A / G-16 / G-17 / G-19 / G-20 / S-01 / S-01A; prepare construction rehabilitation drawings and specifications for public bidding; and prepare a final cost estimate for the designed rehabilitations. (Eligible Design Services Cost = $60,000)

2. **Year 12 Infiltration Rehabilitation Construction (Milton Contract No. S17-1):** Construction of cost-effective and value-effective sewer rehabilitations in Subareas G-02A / G-03B / G-03D / G-09 / G-10A / G-16 / G-17 / G-19 / G-20 / S-01 / S-01A and the performance of construction public bid/award/resident project representative services. Sewer rehabilitation work includes approximately: 4370 LF of cleaning and television inspection; 17,000 LF of testing and sealing of joints; performing 1075 LF of chemical root treatment; installing 5080 LF of CIP pipe; installing 230 LF of CIP short liners; cutting one protruding service connection; testing and grouting 110 service connections; rehabilitating 71 manholes; installing 12 manhole inflow dishes; replacing 4 manhole frames and covers; TV inspection of 4270 LF of sewer and topside inspection of 30 sewer manholes; and performing 22,000 LF of post-construction flow isolation. (Eligible Construction Cost = $579,000 / Eligible Construction Services Cost = $120,000)

3. **Year 13 I/I Investigation and Reporting:** Clean, TV inspect, videotape and record 49,000 LF of sewer; conduct flow isolation on 49,000 LF of sewer; and perform topside manhole inspections of 280 sewer manholes in Subareas G-03A / G-03C / S-07B / S-07D / S-08. (Eligible Investigation Services Cost = $155,000)

The above work will be performed pursuant to the terms and conditions detailed within the March 21, 2017 Agreement(s) For Engineering Services By and Between the Town of Milton and Weston & Sampson Engineers, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received July 14, 2017. Total project cost is estimated at $914,000 (Design = $60,000 / Construction = $579,000 / Construction Services = $120,000 / Investigation Services = $155,000). Eligible MWRA I/I Local Financial Assistance is $914,000. As a result of the above work, an estimated 0.07 mgd of peak I/I will be removed from the collection system.

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT

TOWN OF MILTON, MASSACHUSETTS
YEAR 12 INFILTRATION REHABILITATION - DESIGN / CONSTRUCTION
YEAR 13 I/I INVESTIGATION AND REPORTING - STUDY
MWRA PROJECT NO. WRA-P9-21-3-972

PROJECT SCHEDULE

Item	Start Date	Completion Date
Year 12 Infiltration Rehabilitation		
Design	February 2017	March 2017
Design Review	April 2017	May 2017
Advertise	May 2017	May 2017
Bid Opening	June 2017	June 2017
Contract Award	July 2017	July 2017
Rehabilitation Construction	August 2017	December 2017
Warranty Retesting	March 2018	April 2018
Year 13 I/I Investigation and Reporting		
Investigation	March 2017	June 2017
Data Review/Report Preparation	July 2017	December 2017

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
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TOWN OF NORWOOD, MASSACHUSETTS
MEADOWBROOK PRIORITY AREA 5 SEWER REHABILITATION
MWRA PROJECT NO. WRA-P9-25-3-974

SCOPE OF SERVICES

The Town of Norwood is continuing its efforts to reduce I/I and identify/eliminate sources of sewage contamination in its collection system and improve conveyance of wastewater. Prior investigations in the Meadowbrook area have identified both infiltration and inflow sources and deficiencies in the collection system affecting capacity. Coli sampling in the brook can be traced to the underdrain system that was constructed beneath the sanitary sewer in much of the downtown area of Norwood. Comprehensive rehabilitation of the sewers, manholes and service connections has been successful in eliminating this problem and groundwater infiltration into the sanitary system.

Meadowbrook Priority Area 5 Sewer Rehabilitation - Construction

Project work includes sewer main/manhole rehabilitation construction in Meadowbrook Priority Area 5 covering CIPP lining of 9500 LF of sewer main, lining 38 sewer manholes and lining 160 house service connections.

The above work will be performed pursuant to the terms and conditions detailed within the Agreement For Professional Services By and Between the Town of Norwood and CDM Smith, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received July 17, 2017. Total project cost is estimated at $2,360,000. Eligible MWRA I/I Local Financial Assistance is $2,360,000. As a result of the above work, an estimated 0.20 mgd of peak I/I will be removed from the collection system upon contract completion.

PROJECT SCHEDULE

Item	Start Date	Completion Date
Design	March 2017	July 2017
Construction	September 2017	December 2017

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
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FINANCIAL ASSISTANCE AGREEMENT

CITY OF QUINCY, MASSACHUSETTS
WOLLASTON BEACH AREA SSES I/I REHABILITATION - PHASE II
AVALON BEACH & BAY POINTE MARINA EASEMENT SEWER REHABILITATION
MWRA PROJECT NO. WRA-P9-26-3-971

SCOPE OF SERVICES

The purpose of these projects is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. The project area covers sewer subareas within the Wollaston and Avalon Beach Areas. Project work will include, but not be limited to, the following:

Wollaston Beach Area SSES Rehabilitation - Phase II: Construction of cost-effective and value-effective sewer rehabilitations in sewer subareas within the Wollaston Beach Area and the performance of construction public bid & award/resident project representative services. Sewer rehabilitation work includes approximately: 2670 LF of cleaning, inspection, testing and sealing of joints; heavy cleaning and inspecting 514 LF of sewer; exterior sealing and cementitious lining of 1526 VF of sewer manholes; chemical root treatment of 9411 LF of sewer; installing 16 LF of short liner; installing CIP pipe from manhole-to-manhole in 21,129 LF of sewer; television inspecting, testing and sealing 57 service connections and cutting three (3) protruding service connections. Estimated Project Cost = $2,640,000 (Construction = $2,070,200 / Police Details = $150,700 / Const. Services = $419,100).

Avalon Beach & Bay Pointe Marina Easement Sewer Rehabilitation: Construction of cost-effective and value-effective sewer rehabilitations in sewer subarea along Avalon Beach and the performance of construction design/public bid & award/resident project representative services. Sewer rehabilitation work includes approximately: replacing 260 LF of 15-inch pipe; installing 750 LF of 20-inch CIP pipe and rehabilitating six (6) manholes. Estimated Project Cost = $680,000 (Design/Const. Services = $60,000 / Construction = $600,000 / Police Details = $20,000).

The above work will be performed pursuant to the terms and conditions detailed within the Agreements For Engineering Services Agreement By and Between the City of Quincy and Weston & Sampson Engineers, Inc. and Woodard & Curran, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received July 5, 2017.

Total project cost is estimated at $3,320,000 (Design/Const. Services = $479,100 / Construction = $2,670,200 / Police Details = $170,700). Eligible MWRA I/I Local Financial Assistance is $3,320,000. As a result of the above work, an estimated 0.25 mgd of peak I/I will be removed from the collection system upon contract completion.

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT

CITY OF QUINCY, MASSACHUSETTS
WOLLASTON BEACH AREA SSES I/I REHABILITATION - PHASE II
AVALON BEACH & BAY POINTE MARINA EASEMENT SEWER REHABILITATION
MWRA PROJECT NO. WRA-P9-26-3-971

PROJECT SCHEDULE

Item	Start Date	Completion Date
Wollaston Beach Area SSES Rehabilitation - Phase II:		
Design	January 2017	June 2017
Advertise/Open Bids/Award	July 2017	August 2017
Construction	September 2017	February 2018
Avalon Beach & Bay Pointe Marina Easement Sewer Rehabilitation:		
Design	August 2017	September 2017
Advertise/Open Bids/Award	September 2017	October 2017
Construction	October 2017	December 2017

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT
PROJECT NO. WRA-P9-28-3-970
TOWN OF READING

CONSTRUCTION OF RECOMMENDED SEWER REHABILITATIONS: CURED-IN-PLACE PIPE LINING (CIPPL) PROJECT; ENGINEERING SERVICES DURING CONSTRUCTION AND POLICE DETAILS

SCOPE OF SERVICES

The recommended sewer rehabilitations will primarily consist of Cured-in-Place Pipe Lining (CIPPL). The intent is to include a quantity of CIPPL with an estimated construction cost of $544,000. It is estimated that approximately 17,375 linear feet (lf) of sewer pipe will be included in the Contract. To take full advantage of the available funds of $544,000, this Contract will be bid with 3 Alternates.

The Base Bid will include installing CIPPL in the following locations: Avon St (1 segment – 265 lf); Cross St (2 segments – 361 lf); Fairmont Rd (2 segments – 136 lf); Hopkins St (5 segments – 973 lf); Lisa Lane (5 segments – 821 lf); Main St Easement (1 segment – 80 lf); Maple Ridge Rd (5 segments – 673 lf); Pine Ridge Circle (2 segments – 397 lf); Pine Ridge Rd (7 segments – 1,077 lf); Randall Rd (3 segments – 905 lf); South St (17 segments – 2,376 lf); Summit Dr (1segment – 80 lf); Walnut St (3 segments – 296 lf); Wescroft Rd (9 segments – 1,460 lf); West St (3 segments – 542 lf).

Alternate #1 will include installing CIPPL in the following locations: Balsam Rd (3 segments – 676 lf); Gleason Rd (4 segments – 829 lf); Hemlock Rd (5 segments – 730 lf); Main St (4segments – 631 lf); New Crossing Rd (1 segment – 304 lf); Red Gate Lane (5 segments – 816 lf).

Alternate #2 will include installing CIPPL in the following locations: Alden Circle (3 segments – 368 lf); Sherwood Rd (5 segments – 866 lf); Summer St (3 segments - 453 lf); Vale Rd (1 segment – 230 lf).

Alternate #3 will include installing CIPPL in 5 sewer segments on Main St totaling 1,030 lf.

The construction will also include supporting rehabilitation items such as TV inspection & cleaning; removing protruding service taps; grouting services; spot repairs and other associated apprutenances.

Also included under this funding distribution will be the engineering services to be provided during the construction and the cost Police Details for both this construction project and previously funded Contract #17-14: Collection System Improvements.

PROJECT COST SUMMARY

Description of Task	Estimated Cost
Construction of Sewer Rehabilitations	$ 544,000
Engineering During Construction	$ 100,000
Police Details (Contract #17-14)	$ 100,000
Police Details – CIPPL Contract	$ 100,000
Total Project Cost	**$ 844,000**

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT

PROJECT NO. WRA-P9-28-3-970

TOWN OF READING

CONSTRUCTION OF RECOMMENDED SEWER REHABILITATIONS: CURED-IN-PLACE PIPE LINING (CIPPL) PROJECT; ENGINEERING SERVICES DURING CONSTRUCTION AND POLICE DETAILS

PROJECT SCHEDULE

Description of Work	Start Date	Completion Date
Bid & Award	August 2017	September 2017
Construction	September 2017	December 2017

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT A
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PROJECT NO. WRA-P9-41-3-973

TOWN OF WINCHESTER

CONSTRUCTION OF RECOMMENDED SEWER REHABILITATIONS PER PHASE II SANITARY SEWER EVALUATION SURVEY REPORT OF JUNE 2016

SCOPE OF SERVICES

This project consists of the construction and engineering services provided during construction of the sewer rehabilitations as recommended by the "Phase II Sanitary Sewer Evaluation Survey Report" of June 2016. The recommended sewer rehabilitations will be performed in the West Side and Leslie Road/Lawson Road Areas.

The recommended sewer rehabilitations will include but is not necessarily limited to: cleaning & TV inspection of 5-inch to 16-inch diameter sewers; root treatment of 6-inch to 12-inch diameter sewers and manholes; clean, inspect, testing & sealing of 6-inch to 12-inch diameter sewers; installation of short liners and structural short liners in 6-inch to 12-inch diameter sewers; installation of cured-in-place pipe liners and cured-in-place structural pipeliners in 6-inch to 12-inch diameter sewers; installation of lateral liners; testing & grouting of sewer services; cutting of protruding service connections; open cut repair of sewers; replacing the service connection wyes; cementitious lining of manholes; replacement of manhole frames & covers; building manhole benches & inverts; repairing manhole benches & inverts; sealing combined manhole (#SB-493); furnishing & installing manhole inflow dishes; installing bolted & gasketed manhole frames & covers; and all other related tasks and appurtenances including permanent and temporary pavement, police details and mobilization.

The intent of this project is to prioritize the sewer rehabilitations to take full advantage of the available construction estimated cost of $547,900. Therefore, the actual quantity and type of individual sewer rehabilitation items will not be known until completion of the design and cost estimate which is expected in September 2017.

Also, it is expected that this sewer rehabilitation contract will be bid with a Base Bid and as many as 2 Alternate Bids.

PROJECT COST SUMMARY

Description of Task	Estimated Cost
Construction of Recommended Sewer Rehabilitations	$ 547,900
Engineering Services During Construction	$ 100,000
Total Project Cost	**$ 647,900**

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT

PROJECT NO. WRA-P9-41-3-973

TOWN OF WINCHESTER

CONSTRUCTION OF RECOMMENDED SEWER REHABILITATIONS PER PHASE II SANITARY SEWER EVALUATION SURVEY REPORT OF JUNE 2016

PROJECT SCHEDULE

Description of Work	Start Date	Completion Date
Construction	November 2017	July 2018
Re-Test and Warranty Inspection	April 2019	June 2019

MWRA I/I Local Financial Assistance Program Funding Summary

November 2017 Funding Cycle

Community	Funding Allocation
Braintree	$ 145,000
Cambridge	$ 6,502,545
Melrose	$ 1,081,000
Weymouth	$ 850,000
Woburn	$ 1,733,000
Total	$ 10,311,545

Massachusetts Water Resources Authority - I/I Local Financial Assistance Program

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November 2017 Funding Distribution (Phase 9 - 14th Funding Cycle)

04-Dec-17

Community	MWRA Financial Asst. Project Number	Total Funds Remaining	November 2017 Funding Allocation	November 2017 Grant Portion	November 2017 Loan Portion	Funding Distribution
Braintree	WRA-P9-06-1-975	$1,783,200	$145,000	$108,750	$36,250	Phase 9
Cambridge	WRA-P9-09-3-976	$12,543,045	$6,502,545	$3,530,195	$2,972,350	Phases 6 - 9
Melrose	WRA-P9-20-3-979	$1,081,000	$1,081,000	$810,750	$270,250	Phase 10
Weymouth	WRA-P9-39-3-978	$3,695,000	$850,000	$637,500	$212,500	Phase 9
Woburn	WRA-P9-43-3-977	$1,733,000	$1,733,000	$1,299,750	$433,250	Phase 10
		Total	$10,311,545	$6,386,945	$3,924,600	

Total Projects Funded To Date	Total Allocations (Phases 1 - 10)	Total Distributions (Phases 1 - 10)	Funds Remaining
538	$460,750,000	$351,033,602	$109,716,398

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

TOWN OF BRAINTREE, MASSACHUSETTS
2018 ANNUAL WASTEWATER FLOW MONITORING PROGRAM
MWRA PROJECT NO. WRA-P9-06-1-975

SCOPE OF SERVICES

The purpose of this project is to identify community sewer subareas that contribute excessive I/I. Project work will include, but not be limited to, the following:

Flow Monitoring:

Calibrate and maintain as many as 11 continuous wastewater flow meters throughout the Town. The meters will record flows for a period of one year (132 meter-months). Meters will be installed in manholes containing measurable flow. This task includes as many as ten (10) relocations of meters, which can occur at any point throughout the contract.

Rainfall Monitoring:

Collect rainfall data throughout the course of the monitoring period for purposes of evaluating wastewater flow monitoring data and calculating peak inflow rates. Rainfall data will be collected from three (3) rainfall gauges currently owned by the Town.

Groundwater Monitoring:

Monitor groundwater levels at the USGS ground gauge site located in Duxbury, MA. As this groundwater gauge is located outside the project area, it only serves to indicate the general groundwater trends of the region, not the immediate study area. Weekly groundwater readings will be noted during the monitoring period.

Data Retrieval, Analysis and Reporting:

Monitor flow information on a monthly basis through the metering contractor's internet website. Data in electronic format shall be provided to the Town upon request. On an annual basis, the Town's consultant will estimate inflow and infiltration rates per area metered based on the flow metering information and rainfall data. The Town's consultant will prepare a letter report summarizing the flow monitoring results. The letter report will identify areas that appear to contribute excessive inflow and infiltration based on the data and will provide estimates of peak inflow and infiltration. The data obtained through this flow metering effort may be used to: (1) assess pre- and post-construction wastewater flows; (2) identify potential future metering sites; and (3) reassess the Town's July 2011 Annual I/I Removal Program.

Total project cost is estimated at $145,000. Eligible MWRA I/I Local Financial Assistance is $145,000. Project work will be performed pursuant to the terms and conditions detailed within the approved MWRA Phase 9 I/I Local Financial Assistance Project Application (received October 18, 2017) and the 2015 Agreement For Engineering Services (Task Order No. 10) By And Between The Town of Braintree, MA And Weston & Sampson Engineers, Inc.

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT

TOWN OF BRAINTREE, MASSACHUSETTS
2018 ANNUAL WASTEWATER FLOW MONITORING PROGRAM
MWRA PROJECT NO. WRA-P9-06-1-975

PROJECT SCHEDULE

Item	Start Date	Completion Date
Flow Monitoring	January 2018	December 2018
Summary Report	January 2019	June 2019

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
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PROJECT NO. WRA-P9-09-3-976

CITY OF CAMBRIDGE

CONSTRUCTION OF THE PORT INFRASTRUCTURE IMPROVEMENTS PROJECT: PARKING LOT NO. 6 STORMWATER STORAGE TANK AND COMBINED SEWER FLOW REDUCTION

SCOPE OF SERVICES

The purpose of this construction project is to reduce the combined sewer flows in the CAM017 Area particularly the Cardinal Medeiros Interceptor and the Binney Street combined sewer which surcharge significantly during rain events. A large portion of the stormwater in this specific area has been separated but currently discharges back to the combined sewer. There are separated storm drains in south Massachusetts Avenue but the MBTA Red Line tunnel prevents discharging to these storm drains. This project will allow for this stormwater to be completely separated.

The project area is located in the Port neighborhood along Bishop Allen Drive between Prospect Street and School Street.

The scope of work will include the construction of a 119 ft x 36 ft stormwater storage tank in the City Parking Lot #6 located on Bishop Allen Drive between Columbia Street & Douglas Street. Pumps will be installed and force mains will be constructed to connect the storage tank to the south Massachusetts Avenue storm drains. This work will require installing steel casings by auger boring under the MBTA Red Line tunnel and all other appurtenances to complete this separation project. The separated stormwater which currently discharges to the combined sewer system will be redirected to the constructed stormwater storage tank.

SUMMARY OF PROJECT COSTS

Description of Task	Estimated Total Cost	Estimated Eligible Cost (1)
Construction Contract	$ 19,580,000	$6,502,545
Engineering Services During Construction	$ 3,928,343	$ 0
Police Detail Cost	$ 982,086	$ 0
ESTIMATED TOTAL PROJECT COST	**$24,490,429**	**$6,502,545**

Note: (1) Estimated Eligible Cost based upon the City's remaining Phase 6, all of Phase 7 & 8 and half of the Phase 9 Funds.

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
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PROJECT NO. WRA-P9-09-3-976

CITY OF CAMBRIDGE

CONSTRUCTION OF THE PORT INFRASTRUCTURE IMPROVEMENTS PROJECT: PARKING LOT NO. 6 STORMWATER STORAGE TANK AND COMBINED SEWER FLOW REDUCTION

PROJECT SCHEDULE

Description of Task	Start Date	Completion Date
Bid & Award of Contract	December 2017	February 2018
Construction of Infrastructure Improvements	April 2018	April 2020
Warranty Period / Inspection	April 2020	April 2021

ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

PROJECT NO. WRA-P9-20-3-979
CITY OF MELROSE

CONSTRUCTION OF 2017 CIPP (CURED-IN-PLACE PIPELINER) SEWER REHABILITATION PROJECT; DESIGN, BID & AWARD & CONSTRUCTION OF 2018 OPEN-CUT SEWER REHABILITATION PROJECT

SCOPE OF SERVICES

Construction of 2017 CIPP (Cured-in-Place Pipeliner) Sewer Rehabilitation Project
Based upon the results of the 2017 Sewer System Evaluation Survey, which included extensive cleaning and television inspection of sewer segments, a sewer rehabilitation project was developed. Under this project, the design and preparation of contract documents for an extensive CIPP (Cured-in-Place Pipeliner) Sewer Rehabilitation Project was completed. This work was conducted under MWRA Project #WRA-P9-20-3-959.

The actual Scope of Work for this project consists of approximately 11,000 linear feet (lf) of chemical root treatment of 6-inch to 12-inch diameter pipe; 7,000 lf of CIPP for 6-inch diameter sewer; 19,400 lf of CIPP for 8-inch diameter pipe; 4,450 lf of CIPP for 10-inch diameter pipe; 2,500 lf of CIPP for 12-inch diameter pipe; 350 lf of CIPP for 18-inch diameter pipe; 55,500 lf of post-construction flow isolation and all appurtenances.

Design, Bid & Award & Construction of 2018 Open-cut Sewer Rehabilitation Project
Based upon the results of the 2017 Sewer System Evaluation Survey, some sewer segments were recommended for Open-Cut rehabilitation due to the deteriorated condition of the sewer pipe. Also, a few catch basins, private drains and sump pumps were observed discharging to the sewer system. Under this project, the design and preparation of contract documents for these sewer rehabilitations will be completed. The construction contract will be bid and awarded and the construction of the sewer rehabilitation will be completed.

This funding distribution will also include a cost of $40,000 for City Force Account which is associated with a Project Engineer in the City Engineering Department to oversee the two Sewer Rehabilitation Contracts and to coordinate it with the other ongoing projects in the City. Police Details estimated at $80,000 are also included.

PROJECT COST SUMMARY

DESCRIPTION OF WORK	TOTAL COST
Construction of 2017 CIPP (Cured-in-Place Pipeliner) Sewer Rehabilitation Project	
Engineering Services During Construction of Sewer Rehabilitations	$ 54,400
Construction of Sewer Rehabilitations	$ 1,118,750
Design, Bid & Award & Construction of 2018 Open-cut Sewer Rehabilitation Project	
Design, Prepare Bid Documents, Bid & Award	$ 50,000
Engineering Services During Construction of Sewer Rehabilitations	$ 50,000
Construction of Sewer Rehabilitations	$ 236,330
Force Account (City Project Engineer)	$ 40,000
Police Details	$ 80,000
Estimated Total Project Cost	**$ 1,629,480**

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT

PROJECT NO. WRA-P9-20-3-979
CITY OF MELROSE

CONSTRUCTION OF 2017 CIPP (CURED-IN-PLACE PIPELINER) SEWER REHABILITATION PROJECT; DESIGN, BID & AWARD & CONSTRUCTION OF 2018 OPEN-CUT SEWER REHABILITATION PROJECT

PROJECT SCHEDULE

Description of Work	Start Date	Completion Date
2017 CIPP Sewer Rehabilitation Project		
Construction	October 2017	February 2018
Re-testing & Warranty Inspection	March 2019	May 2019
2018 Open-cut Sewer Rehabilitation Project		
Design of Sewer Rehabilitations	November 2017	January 2018
Bid & Award	January 2018	February 2018
Construction	March 2018	June 2018
Re-testing & Warranty Inspection	March 2019	May 2019

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

TOWN OF WEYMOUTH, MASSACHUSETTS
2017 SEWER SYSTEM INFILTRATION REHABILITATION
(WEYMOUTH CONTRACT PW-17-001-S)
MWRA PROJECT NO. WRA-P9-39-3-978

SCOPE OF SERVICES

The purpose of this project is to rehabilitate community sewer subareas (Subareas B-1 / B-4 / C-3 / N-5) that contribute excessive I/I.

Rehabilitation work will include, but not be limited to, the following: 2964 LF of cleaning and TV inspection; 9847 LF of cleaning, inspecting, testing and sealing; root treatment of 2986 LF of sewer main and one (1) manhole; installing 2297 LF of CIP pipe and 74 LF of CIP short liners; testing and grouting 25 service connections; cementitious lining of nine manholes (95 VF); furnishing and installing eight (8) manhole frames and covers; furnishing and installing eleven (11) manhole inflow dishes; and performing one (1) open cut point repair.

Total rehabilitation project cost is estimated at $850,00. Eligible MWRA I/I Local Financial Assistance is $850,000. Project work will be performed pursuant to the terms and conditions detailed within the approved MWRA Phase 9 I/I Local Financial Assistance Project Application (received October 24, 2017) and the Town of Weymouth Sewer System Infiltration Rehabilitation Contract Documents (Contract PW-17-001-S: dated October 2017). As a result of the above work, an estimated 0.14 mgd of peak I/I will be removed from the collection system upon contract completion.

PROJECT SCHEDULE

Item	Start Date	Completion Date
Bid & Award	November 2017	November 2017
Construction w/Warranty Retesting	December 2017	March 2018

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT
PROJECT NO. WRA-P9-43-3-977
CITY OF WOBURN
CONSTRUCTION OF RECOMMENDED SEWER REHABILITATIONS IN CIP PROJECT 1 & 2 AREAS
SCOPE OF SERVICES

The CIP Project 1 Inspection and Assessment project included sewers in the Cross Street (CS) subarea. A portion of these sewers were rehabilitated under the Main Street Sanitary Sewer Rehabilitations project and the CIP Project 1 Rehabilitations project. Rehabilitations of additional sewers in this area are being included in this project as described below:

Base Bid - Area approximately bound by Green Street to the north, Blueberry Hill Road to the south, Allen Street to the east, and Eastern Avenue to the west.

Alternate Bid No. 1 - Area approximately bound by Jefferson Avenue to the north, Green Street to the south, Spring Court to the east, and Prospect Street to the west.

Alternate Bid No. 2 - Myrtle Street, Summer Street, Edgehill Road, Jefferson Avenue, and Spring Court Extension.

The CIP Project 2 Inspection and Assessment project included sewer mini-systems ES-01, ES-02, ES-03, ES-04, S-05, and ES-06. Sewers in sewer mini-systems ES-01 and ES-02 are included in this project. The work in these areas focus on Montvale Avenue, Albany Street, and Hill Street sewers. This work will be included in the base bid.

Base Bid: Open cut repair 611 linear feet (lf) of sewer; installing 4 sewer manholes; replacing 1 sewer service connection; chemical root treatment of 5,407 lf of sewer and 4 sewer manholes; cleaning, inspection, testing, and sealing 1,255 lf of sewers; installing 36 lf of cured-in-place short liners; installing 13 lf of structural cured-in-place short liners, 10,028 lf of cured-in-place pipe and reinstatement of 177 service connections, 1,389 lf of structural cured-in-place pipe and reinstatement of 31 service connections; installing 1 cured-in-place lateral liner; cementitious lining of 571 vf of manholes; building 5 manhole benches & inverts; installing 4 manhole frames & covers; installing 4 manhole inflow dishes; installing 5 vertical feet of internal drop connections; cutting 16 protruding service connections; testing & grouting 2 service connections; cleaning and inspection of 856 lf of sewer; and post construction flow evaluation of 12,672 lf of sewer.

Alternate Bid No. 1: Chemical root treatment of 2,315 lf of sewer and 2 sewer manholes; cleaning, inspection, testing, and sealing 3,766 lf of sewers; installing 69 lf of cured-in-place short liners; installing 8 lf of structural cured-in-place short liners, 1,683 lf of cured-in-place pipe and reinstatement of 36 service connections, 320 lf of structural cured-in-place pipe and reinstatement of 4 service connections; cementitious lining of 393 vf of manholes; building of 2 manhole benches & inverts; installing 1 manhole frame & cover; installing 8 manhole inflow dishes; installing 4 vf of internal drop connections; cutting 5 protruding service connections; testing & grouting 8 service connections; sealing 1 underdrain access port; cleaning and inspection of 1,203 lf of sewer; and post construction flow evaluation of 5,769 lf of sewer.

Alternate Bid No. 2: Chemical root treatment of 648 lf of sewer; cleaning, inspection, testing, and sealing 186 lf of sewers; installing 4 lf of cured-in-place short liners, 2,604 lf of cured-in-place pipe and reinstatement of 29 service connections, 633 lf of structural cured-in-place pipe and reinstatement of 3 service connections; cementitious lining of 185 vf of manholes; building of 2 manhole benches & inverts; installing 7 manhole inflow dishes; sealing of 1 underdrain access port; and post construction flow evaluation of 3,423 lf of sewer.

PROJECT COST SUMMARY

Description of Task	Estimated Cost
Construction of Recommended Sewer Rehabilitations in CIP Project 1 & 2 Areas	$1,500,000
Engineering Services During Construction in CIP Project 1 & 2 Areas	$ 233,000
TOTAL ESTIMATED PROJECT COST	**$1,733,000**

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM – PHASE 10
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT

PROJECT NO. WRA-P9-43-3-977

CITY OF WOBURN

CONSTRUCTION OF RECOMMENDED SEWER REHABILITATIONS IN CIP PROJECT 1 & 2 AREAS

PROJECT SCHEDULE

Milestone Description	Start Date	Completion Date
Construction of Recommended Sewer Rehabilitations in CIP Project 1 & 2 Areas	January 2018	July 2018
Warranty Inspection & Retesting	March 2019	April 2019

MWRA I/I Local Financial Assistance Program Funding Summary

February 2018 Funding Cycle

Community	Funding Allocation
Braintree	$ 760,000
Stoughton	$ 93,800
Watertown	$ 524,000
Total	$ 1,377,800

Massachusetts Water Resources Authority - I/I Local Financial Assistance Program

estes

February 2018 Funding Distribution (Phase 9 - 15th Funding Cycle)

23-Mar-18

Community	MWRA Financial Asst. Project Number	Total Funds Remaining	February 2018 Funding Allocation	February 2018 Grant Portion	February 2018 Loan Portion	Funding Distribution
Braintree	WRA-P9-06-3-981	$1,638,200	$760,000	$570,000	$190,000	Phase 9 / 10
Stoughton	WRA-P9-32-3-982	$93,800	$93,800	$70,350	$23,450	Phases 10
Watertown	WRA-P9-36-3-980	$2,624,000	$524,000	$235,800	$288,200	Phase 8
		Total	$1,377,800	$876,150	$501,650	

Total Projects Funded To Date	Total Allocations (Phases 1 - 10)	Total Distributions (Phases 1 - 10)	Funds Remaining
541	$460,750,000	$352,411,402	$108,338,598

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

TOWN OF BRAINTREE, MASSACHUSETTS
I/I INVESTIGATION AND REHABILITATION PROGRAM - YEAR 7
MWRA PROJECT NO. WRA-P9-06-3-981

SCOPE OF SERVICES

The purpose of this project is to identify and rehabilitate community sewer subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. Project work will include, but not be limited to, the following:

Year 7 I/I Investigation - Study / Design / Bid & Award (Est. Cost = $ 210,000)

1. Flow isolate as much as 49,000 LF of sewer in Braintree Sewer Subareas C3 / L6 / L7 / T1 to quantify infiltration amounts within manhole-to-manhole segments of sewer. The inspection will be conducted between the hours of 12AM and 6AM when groundwater levels are typically at their highest and sanitary flows are at a minimum.

2. Clean, TV inspect, videotape and record as much as 49,000 LF of sewer in Braintree Sewer Subareas C3 / L6 / L7 / T1. The TV inspection will be performed to locate problem areas and I/I sources within manhole-to-manhole segments of sewer. The inspection will be conducted in Spring 2018 when groundwater levels are typically at their highest.

3. Conduct a topside physical survey of as many as 225 sewer manholes in Braintree Sewer Subareas C3 / L6 / L7 / T1 to identify defects and I/I sources. A written log will be furnished for each manhole inspected.

4. Prepare a letter report that details areas in which work was performed, summarizes work completed to date and includes recommendations, a cost-effectiveness analysis and prioritization analysis for rehabilitation of pipeline/manhole defects and I/I sources identified during this investigation. [Study = $150,000 / Design (with Bid & Award) = $60,000]

Year 7 I/I Investigation - Construction / Construction Services (Est. Cost = $ 550,000)

Construction plans and specifications (to remove excessive I/I identified during the above Year 7 I/I Investigation) will be developed and submitted, followed by rehabilitation construction. [Construction = $450,000 / Construction Services = $100,000]

Total project cost is estimated at $760,000. Eligible MWRA I/I Local Financial Assistance is $760,000. As a result of the above work, an estimated 0.40 mgd of peak I/I will be removed from the collection system upon contract completion.

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT

TOWN OF BRAINTREE, MASSACHUSETTS
I/I INVESTIGATION AND REHABILITATION PROGRAM - YEAR 7
MWRA PROJECT NO. WRA-P9-06-3-981

PROJECT SCHEDULE

Item	Start Date	Completion Date
Year 7 I/I Investigation / Rehabilitation:		
I/I Investigation and Reporting	March 2018	November 2018
Design	February 2019	April 2019
Bid and Award	May 2019	June 2019
Construction	July 2019	November 2019
Warranty Retesting	March 2020	March 2020

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

TOWN OF STOUGHTON, MASSACHESETTS
YEARS 3 / 4 / 5 I/I REHABILITATION - DESIGN / CONSTRUCTION
YEAR 6 SPRING 2018 I/I INVESTIGATION AND REPORTING - STUDY
MWRA PROJECT NO. WRA-P9-32-3-982

SCOPE OF SERVICES

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. The project area includes Stoughton Subareas 1 - 15. Project work will include, but not be limited to, the following:

1. **Years 3 / 4 / 5 I/I Rehabilitation Design:** Design cost-effective / value-effective sewer rehabilitations; prepare construction rehabilitation drawings and specifications for public bidding; and prepare a final cost estimate for the designed rehabilitations. (Estimated Design Services Cost = $85,000). (Task Order No. FY18 #1)

2. **Years 3 / 4 / 5 I/I Rehabilitation Construction:** Construction of cost-effective / value-effective sewer rehabilitations and the performance of construction public bid/award/ resident project representative services. Sewer rehabilitation work includes approximately: 22,900 LF of cleaning and television inspection; 2200 LF of heavy cleaning; installing 3600 LF of CIP pipe; installing 254 LF of short liners; cutting 23 protruding service connections; testing & grouting 73 service connections; inspecting 78 manholes; rehabilitating 53 manholes; installing 24 manhole inflow dishes; and replacing/resetting 24 manhole frames and covers. (Estimated Construction Cost = $800,000 / Estimated Construction Services Cost = $120,000). (Task Order No. FY18 #3)

3. **Year 6 Spring 2018 I/I Investigation and Reporting:** TV inspection of 25,000 LF of sewer and review TV inspection videotapes of 50,000 LF of sewer in selected sewers within 200-400 feet of the 100-Year Flood Plan. Perform topside manhole inspections of 250 sanitary manholes within 200-400 feet of the 100-Year Flood Plan. (Estimated Investigation Services Cost = $120,000). (Task Order No. FY18 #4)

The above work will be performed pursuant to the terms and conditions detailed within Task Order No. FY18 under the August 24, 2017 Agreement For Engineering Services By and Between the Town of Stoughton and Weston & Sampson Engineers, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received February 8, 2018.

Total project cost is estimated at $1,125,000. (Design = $85,000 / Construction = $800,000 / Construction Services = $120,000 / Investigation Services = $120,000). Eligible MWRA I/I Local Financial Assistance is $93,800 [unspent MWRA I/I financial assistance ($214,211) from Stoughton Contract 15-1 (MWRA Project No. WRA-P9-32-3-902) will also be applied to this project]. As a result of the above work, an estimated 0.11 mgd of peak I/I will be removed from the collection system upon contract completion.

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
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TOWN OF STOUGHTON, MASSACHESETTS
YEARS 3 / 4 / 5 I/I REHABILITATION - DESIGN / CONSTRUCTION
YEAR 6 SPRING 2018 I/I INVESTIGATION AND REPORTING - STUDY
MWRA PROJECT NO. WRA-P9-32-3-982

PROJECT SCHEDULE

Item	Start Date	Completion Date
Years 3 / 4 / 5 I/I Rehabilitation		
Design	November 2017	February 2018
Design Review	February 2018	March 2018
Advertise	April 2018	April 2018
Bid Opening	May 2018	May 2018
Contract Award	June 2018	June 2018
Rehabilitation Construction	August 2018	December 2018
Warranty Retesting	April 2019	May 2019
Year 6 Spring 2018 I/I Investigation and Reporting		
Manhole Inspections	March 2018	May 2018
TV Inspection Videotape Review	March 2018	August 2018
Data Review/Report Preparation	August 2018	November 2018

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

TOWN OF WATERTOWN, MASSACHUSETTS
I/I INVESTIGATION & REHABILITATION PROGRAM
(SEWER SUBAREAS 1 / 3 / 9)

MWRA PROJECT NO. WRA-P9-36-3-980

SCOPE OF SERVICES

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. Project work will include, but not be limited to, the following:

1. Light clean, TV inspect, videotape and record as much as 42,050 LF of sewer in Watertown Sewer Subareas 1 / 3 / 9. The TV inspection will be performed to locate problem areas and I/I sources within manhole-to-manhole segments of sewer. One complete set of video files and TV inspection logs shall be provided. The inspection will be conducted in Spring 2018 when groundwater levels are typically at their highest.

2. Conduct topside physical survey of as many as 217 sewer manholes in Watertown Sewer Subareas 1 / 3 / 9 for defects, I/I sources and underdrain access points. A written log will be furnished for each manhole inspected.

3. Prepare a letter report that details areas in which work was performed, summarizes work completed to date and includes recommendations, a cost-effectiveness analysis, a transportation & treatment cost analysis and prioritization analysis for rehabilitation of pipeline/manhole defects and I/I sources identified during the investigation.

4. Using the information collected in the above investigation, cost-effective rehabilitation design will be performed. In addition, specifications and plans will be prepared for public bidding. A final opinion of probable construction cost will be estimated.

Total project cost is estimated at $1,454,654. Eligible MWRA I/I Local Financial Assistance is $524,000 (I/I Investigation = $217,254 / Design = $87,400 / Construction = $219,346).

Project work will be performed pursuant to the terms and conditions detailed within the approved MWRA Phase 9 I/I Local Financial Assistance Project Application (received December 27, 2017) and the Agreement For Engineering Services By And Between The Town of Watertown, MA And Weston & Sampson Engineers, Inc. As a result of the above work, an estimated 0.20 mgd of peak I/I will be removed from the collection system upon contract completion.

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
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FINANCIAL ASSISTANCE AGREEMENT

TOWN OF WATERTOWN, MASSACHUSETTS
I/I INVESTIGATION & REHABILITATION PROGRAM
(SEWER SUBAREAS 1 / 3 / 9)

MWRA PROJECT NO. WRA-P9-36-3-980

PROJECT SCHEDULE

Item	Start Date	Completion Date
I/I Investigation and Evaluation	March 2018	December 2018
Design	January 2019	March 2019
Rehabilitation Construction	May 2019	September 2019

MWRA I/I Local Financial Assistance Program Funding Summary

May 2018 Funding Cycle

Community	Funding Allocation
Arlington	$ 210,000
Medford	$ 1,047,000
Needham	$ 326,450
Wellesley	$ 326,280
Total	$ 1,909,730

Massachusetts Water Resources Authority - I/I Local Financial Assistance Program

May 2018 Funding Distribution (Phase 9 - 16th Funding Cycle)

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12-Jul-18

Community	MWRA Financial Asst. Project Number	Total Funds Remaining	May 2018 Funding Allocation	May 2018 Grant Portion	May 2018 Loan Portion	Funding Distribution
Arlington	WRA-P9-01-3-984	$210,000	$210,000	$157,500	$52,500	Phase 10
Medford	WRA-P9-19-3-983	$5,073,000	$1,047,000	$471,150	$575,850	Phase 8
Needham	WRA-P9-23-3-985	$3,365,450	$326,450	$146,903	$179,548	Phase 6
Wellesley	WRA-P9-37-3-986	$2,453,476	$326,280	$146,826	$179,454	Phase 7 / 8
		Total	$1,909,730	$922,379	$987,352	

Total Projects Funded To Date	Total Allocations (Phases 1 - 10)	Total Distributions (Phases 1 - 10)	Funds Remaining
545	$460,750,000	$354,321,132	$106,428,868

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

TOWN OF ARLINGTON, MASSACHUSETTS

PHASE #10 SANITARY SEWER REHABILITATIONS

MWRA PROJECT NO. WRA-P9-01-3-984

SCOPE OF SERVICES

The purpose of these projects is to identify and rehabilitate community sewer subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. Project work will include, but not be limited to, the following:

Phase #10 Sanitary Sewer Rehabilitation Construction: Construction of cost-effective / value-effective sewer rehabilitations. Sewer rehabilitation work includes: performing 1186 LF of sewer pipe root treatment; replacing 16 LF of 8-inch PVC gravity sewer; CIP pipe lining of 7312 LF of 6 / 8 / 18-inch sewer pipe; structural CIP pipe lining of 262 LF of 8-inch sewer pipe; grouting 142 reinstated service connections; grouting six (6) service connections; installing 15 LF of 6-inch PVC building connections; cutting six (6) protruding service connections; replacing four (4) sewer manholes; cementitious lining of existing sewer manholes (354 VF); grouting six (6) sewer manholes; installing seven (7) sewer manhole inflow dishes; furnishing & installing one (1) manhole frame & cover; and performing 7829 LF of post-construction flow isolation.

Overall project cost is estimated at $580,750. Eligible MWRA I/I Local Financial Assistance is $210,000. As a result of the above Phase #10 Sanitary System Rehabilitation work, an estimated 0.07 mgd of peak infiltration will be removed from the collection system upon contract completion.

PROJECT SCHEDULE

Item	Start Date	Completion Date
Phase #10 Sanitary Sewer Rehabilitations:		
Construction	June 2018	December 2018
Warranty Retesting	May 2019	June 2019

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
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CITY OF MEDFORD, MASSACHUSETTS

MINI-SYSTEM "P" SEWER SYSTEM REHABILITATION
CITY-WIDE INFLOW / INFILTRATION METERING PROGRAM

MWRA PROJECT NO. WRA-P9-19-3-983

SCOPE OF SERVICES

The purpose of these projects is to identify and rehabilitate community sewer subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. Project work will include, but not be limited to, the following:

Mini-System "P" Sewer System Rehabilitation Construction: Construction of cost-effective / value-effective sewer rehabilitations. Sewer rehabilitation work includes: installing 1568 LF of 8 to 12-inch PVC sanitary sewer pipe; performing 4 sanitary sewer point repairs; rehabilitating 25 sewer service connections and 8 sewer service chimneys; rehabilitating/repairing 72 sewer manholes; lining the interior of existing sewer manholes (268 VF); replacing 25 sewer manhole frames and covers; testing and sealing 672 sewer pipe joints; and performing 5455 LF of sewer pipe root treatment. [Estimated Construction Cost = $708,500] (Note: Mini-System "P" Sewer System Rehabilitation Design was financed under MWRA Project No. WRA-P9-13-3-927)

City-Wide Inflow / Infiltration Metering Program: Program work includes (1) Installing 25 flow meters which will cover the majority of the City's wastewater collection system. The flow meters will be installed in two phases: Phase 1 will consist of the installation of 11 flow meters in Spring 2018; and Phase 2 will consist of the installation of 14 flow meters in Spring 2019; (2) Providing meter data analysis and identify areas with high I/I quantities; (3) Providing an interim summary report to MassDEP / MWRA after year one of metering; (4) Preparing a work schedule for further study in high incidence areas; (5) Preparing a detailed sewer system rehabilitation plan for those study areas identified with the highest I/I quantities; and (6) Providing a final summary report for MassDEP / MWRA which outlines all findings and recommendations. This report will be drafted upon completion of year two of metering. [Estimated Program Cost = $338,500 (Task 1: $131,000 / Task 2: $207,500)]

Overall project cost is estimated at $1,047,000. Eligible MWRA I/I Local Financial Assistance is $1,047,000. As a result of the above Mini-System "P" Sewer System Rehabilitation work, an estimated 0.51 mgd of peak I/I will be removed from the collection system upon contract completion.

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT

CITY OF MEDFORD, MASSACHUSETTS

MINI-SYSTEM "P" SEWER SYSTEM REHABILITATION
CITY-WIDE INFLOW / INFILTRATION METERING PROGRAM

MWRA PROJECT NO. WRA-P9-19-3-983

PROJECT SCHEDULE

Item	Start Date	Completion Date
Mini-System "P" Sewer System Rehabilitation:		
Construction	July 2018	November 2019
City-Wide Inflow / Infiltration Metering Program:		
Phase 1 Metering / Analysis	March 2018	September 2018
Phase 1 Summary Report	October 2018	December 2018
Phase 2 Metering / Analysis	March 2019	September 2019
Phase 2 Summary Report	October 2019	December 2019

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

TOWN OF NEEDHAM, MASSACHUSETTS

ALDEN ROAD SEWER PUMP STATION REPLACEMENT
(DESIGN / CONSTRUCTION)

MWRA PROJECT NO. WRA-P9-23-3-985

SCOPE OF SERVICES

The purposed project encompasses contracted design / construction leading to the replacement of the Alden Road Sewer Pump Station in the Town of Needham.

Project work will include, but not be limited to, the following:

1. Replace approximately 50 linear feet (LF) of gravity sewer;
2. Replace approximately 50 LF of sewer force main;
3. Replace one (1) sewer manhole structure; and
4. Furnish and install new pump station wet well.

The above work will be performed pursuant to the terms and conditions detailed within the Agreement For Professional Services By and Between the Town of Needham and Environmental Partners Group, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received May 15, 2018.

Total project cost is estimated at $600,000. Eligible MWRA I/I Local Financial Assistance is $326,450 (Design/Permitting/Bidding = $35,080 / Construction = $291,370). As a result of the above work, an estimated 0.20 mgd of peak I/I will be removed from the collection system upon contract completion.

PROJECT SCHEDULE

Item	Start Date	Completion Date
Design	February 2018	May 2018
Bidding	May 2018	July 2018
Construction	August 2018	December 2018

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

TOWN OF WELLESLEY, MASSACHUSETTS

SEWER SYSTEM INSPECTION AND REHABILITATION
(CONTRACT NO. 13C-460-1564)

McLEAN STREET SEWER REPAIR

CLIFF ROAD SEWER REPAIR

WORCESTER STREET (ROUTE 9) SEWER REPAIR

MWRA PROJECT NO. WRA-P9-37-3-986

SCOPE OF SERVICES

Sewer System Inspection and Rehabilitation (Contract No. 13C-460-1564): Project rehabilitation consisted of chemical root treatment of 6975 LF of sewer; testing 6995 joints and sealing/retesting 2371 joints; installing 21 LF of CIP short liners; testing & sealing 13 LF of service connections and sealing 388 vertical feet of manholes. Total project cost = $263,880. An estimated 0.03 mgd of peak infiltration was removed from the community collection system.

McLean Street Sewer Repair: Project rehabilitation work consisted of the replacement of 200 LF of existing 10-inch VC pipe with 10-inch HDPE pipe via pipe bursting. Work on McLean Street was located between Willow Street and Ashmont Road. Total project cost = $34,720. An estimated 0.01 mgd of peak infiltration was removed from the community collection system.

Cliff Road Sewer Repair: Project rehabilitation work consisted of the replacement of five (5) LF of existing 8-inch VC pipe with 8-inch PVC pipe via open cut. Work on Cliff Road was located between Pierce Road and No. 206 Cliff Road. Total project cost = $7000. An estimated 0.01 mgd of peak infiltration was removed from the community collection system.

Worcester Street (Route 9) Sewer Repair: Project rehabilitation work consisted of a spot repair of six (6) LF of existing 10-inch VC pipe with 10-inch PVC pipe. Work on Route 9 was located between Rockland Street and No. 504 Worcester Street. Total project cost = $20,680. An estimated 0.01 mgd of peak infiltration was removed from the community collection system.

The above work was performed pursuant to the terms and conditions detailed within the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received May 16, 2018. Combined cost for the above projects totals $326,280. Eligible MWRA I/I Local Financial Assistance is $326,280. An estimated 0.06 mgd of peak infiltration was removed from the community collection system.

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

TOWN OF WELLESLEY, MASSACHUSETTS

SEWER SYSTEM INSPECTION AND REHABILITATION
(CONTRACT NO. 13C-460-1564)

McLEAN STREET SEWER REPAIR

CLIFF ROAD SEWER REPAIR

WORCESTER STREET (ROUTE 9) SEWER REPAIR

MWRA PROJECT NO. WRA-P9-37-3-986

PROJECT SCHEDULE

Item	Start Date	Completion Date
Sewer System Inspection and Rehabilitation (Contract No. 13C-460-1564)		
Sewer Inspection/Rehabilitation	July 2016	July 2017
McLean Street Sewer Repair	September 2016	October 2016
Cliff Road Sewer Repair	September 2017	September 2017
Route 9 Sewer Repair	September 2017	September 2017

ATTACHMENT 5
TO
MWRA ANNUAL I/I REDUCTION REPORT FOR FY18
Reporting Period: July 2017 Through June 2018

I/I REDUCTION STATUS UPDATE FOR MEMBER COMMUNITIES

The MWRA is working cooperatively with member communities to develop phased I/I reduction programs throughout the service area. The Authority will encourage continuing community efforts in I/I reduction as detailed in the MWRA Regional I/I Reduction Plan. Many community I/I projects are funded through MWRA's I/I Local Financial Assistance Program. This $760.75 million grant/loan program was established to provide funding to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned collection systems. Through FY18, MWRA has distributed $354 million to fund local projects. A detailed update on MWRA's I/I Local Financial Assistance Program is included as Attachment 4 to this report.

The Authority has instituted a computer-based questionnaire format for communities to submit annual status reports on their I/I reduction programs. All 43-member sewer communities have submitted information to MWRA for FY18. Community information is summarized below:

1. ARLINGTON: North System

Background Information:

- Miles of Sewer: 106
- Sewered Population: 43,993
- Three Year (CY15 - CY17) Annual Average I/I: 1.77 mgd
- MassDEP Administrative Actions: ACOP-NE-10-1N006 (August, 2010)
  NON-NE-09-1N003 (July 2009)
  NON-NE-07-1N004 (June 2007)

Latest I/I or SSES Reports:

Sewer System Investigation Area #6 Final Report (November 2011)
Kimball Road/MWRA Millbrook Valley Relief Sewer Evaluation Final Report (November 2011)
Area #6 Smoke Testing, Dye Testing and Dye Flooding Final Report (December 2011)
Town-wide I/I Analysis Final Report (April 2012)
Additional Inspection of Sewer on Pond Lane, Academy St & Mystic Lake Drive Letter Report (May 2012)
Area #6 (Kimball Road) Building Inspections Report (January 2013)
Sewer system Investigation Area #7 Report (August 2013)
Area #4, 5 & 7 Smoke Testing Report (December 2013)
Area #8 Sewer System Investigation Report (August 2014)
Area #9 Sewer System Investigation Report (August 2015)
Area #10 Sewer System Investigation Report (August 2016)
Phase #7 Sanitary Sewer Rehabilitation – Post Rehabilitation Flow Evaluation (July 2017)
Area #11 Sewer System Investigation Report (expected August 2017)
Phase #8 Sanitary Sewer Rehabilitation Report – Post Rehabilitation Flow Evaluation (July 2018)

Private Source Inflow Removal Program: The Arlington Department of Public Works is currently implementing a water meter replacement program. At the time of the water meter replacement, a building inspection is performed by the town employee while they are still in the home. The building inspections are ongoing and anticipated to be completed Town-wide by June 2019.

I/I Rehabilitation Projects in Design or Construction: The Construction of the Phase #7 Sanitary Sewer Rehabilitations – Bid No. 15-25 was substantially completed in April 2016. The following work was completed: performed 7044 LF of chemical root treatment; CIPP lining of 13,737 LF of 8" to 12" sewer; structural CIPP lining of 8" & 12" sewer; cementitious lining of 695 VF of manholes; grouting & patching of 8 manholes; building 4 manhole benches & inverts; replacing 3 manhole frames & covers; raising two manhole frames & covers; installing 6 inflow dishes; installing 33 VF of internal drop connections; sealing a manhole Access Port; grouting of 206 services; cutting 14 protruding service connections. The Warranty Inspection work for this project was completed in April 2017.

The Phase #8 Sanitary Sewer Rehabilitations – Bid No. 16-26 was substantially completed in November 2016. The work completed consisted of: root treatment of 2711 LF of sewer; cleaned & inspected 844 LF of sewer; installed 8,584 LF of CIPP lining; installed 116 LF of structural CIPP lining; reinstated & grouted one lateral liner; installed 8 LF of structural short liners; cementitious lining of 364 VF of manholes; grouted & patched 5 manholes; separated 5 shared manholes; installed 5 internal drop connections; installed an inflow dish; replaced 2 manhole frames and covers; open cut point repair at 4 locations; installed 3 precast sewer manholes. The Warranty Inspection work for this project was completed in April 2017.

The bids for Phase #9 Sanitary Sewer Rehabilitations – Bid No. 17-15 were opened on April 6, 2017. The Town awarded the Contract to the low bidder, Rapid Flow, Inc. The Town awarded the Base Bid, Alternate #1 and Alternate #2 of the Contract. Work began in June 2017. The project is expected to be substantially complete by September 2017 with Warranty Inspections completed by July 2018.

Reporting Period Activity: The Town is continuing with the 12-year Sewer System Investigation and Planning Program which was initiated in September 2006.

The warranty inspection for the Phase #8 Sanitary Sewer Rehabilitations - Bid No. 16-26 was completed in March 2017. The Area #11 Sewer System Investigation Report, which includes sewer investigations in mini-systems 16, 47, 51, O, P, U, X, AB, AC, AP, AQ, AR, OS & OT, was completed in August 2017. The Phase #10 Sanitary Sewer Rehabilitations – Bid No. 18-32 will be opened on July 19, 2018. The project is expected to be substantially complete by November 2018 with Warranty Inspections complete by November 2019.

The Area #8, 9, 10, &11 Smoke Testing Report is expected to be complete by March 2019.

The Phase #9 Sanitary Sewer Rehabilitations – Bid No. 17-15 was substantially completed in September 2017. The following work was completed: root treatment of 1853 LF of sewer; installed 5902 LF of cured-in-place pipe (CIPP) lining; grouted 128 service connections in cured-in-place-pipe; cut three (3) protruding service connections; cementitious lining of 247 VF of manholes; grouted and patched five (5) manholes; installed four (4) internal drop connections; installed two (2) manhole inflow dishes; replaced one (1) frame and cover; open cut point repair at five (5) locations; installed five (5) precast manholes.

The Phase #10 Sanitary Sewer Rehabilitations – Bid No. 18-32 will be opened on July 19, 2018. The project is expected to be substantially complete by November 2018 with warranty inspections complete by November 2019.

The Area #10 Sewer System Investigation Report, which includes sewer investigations in mini-systems C, D, E, Q, R, Z, 14, 16, 18, 19, 32, 36, 37, 38, 44, AA, AF, AG, AH, AI, AL, AM, AX & AY, was completed in August 2016.

The Area #11 Sewer System Investigation Report, which includes sewer investigations in mini-systems 16, 47, 51,), P, U, X, AB, AC, AP, AQ, AR, OS 7 OT is expected to be completed in July 2018.

In May 2018, $210,000 in grant/loan funds were distributed for the Phase #10 Sanitary Sewer Rehabilitation Construction. Details of this project are included in Attachment 4. The estimated Peak Infiltration removal for this project is 0.07 mgd (MWRA Project No. WRA-P9-01-3-984).

MWRA I/I Local Financial Assistance Program: The community has financed twenty-two (23) I/I reduction projects through the Authority's funding assistance program. Of the $13,703,000 allotted through the Program's Phases 1 - 13, the community has $5,280,000 remaining in funding assistance.

2. ASHLAND: South System

Background Information:
- Miles of Sewer: 66
- Sewered Population: 13,549
- Three Year (CY15 - CY17) Annual Average I/I: 0.42 mgd
- MassDEP Administrative Actions: No. 594 (November 1985)

Latest I/I or SSES Report: I/I Investigation: TV Inspection (2014 Summary Report): April 2015
I/I Investigation: TV Inspection (2017 Summary Report): Ongoing

Private Source Inflow Removal Program: Sump pump/roof leader investigations (via DPW personnel) by sub-basin during FY17/18:

Sub-Basin 1:	47 inspections	Sub-Basin 2:	66 inspections
Sub-Basin 3:	41 inspections	Sub-Basin 4:	39 inspections

I/I Rehabilitation Projects in Design or Construction: The Town has contracted Truax Corp. to perform internal TV inspection of 199,500 LF of sewer main in Ashland Sewer System Sub-Basins 1 / 2 (MWRA Project No. WRA-P8-02-1-827). The majority of the sewer main investigation work has been completed. A 2017 Investigations Summary Report is currently being prepared. The Report will address sewer main rehabilitation options. A sewer rehabilitation contract will be awarded in CY18, with repair work scheduled over the next three years as funding becomes available. Also, the West Union Transmission sewer replacement work is ongoing.

Reporting Period Activity: A Town-wide wastewater flow metering and I/I identification project (MWRA Project No. WRA-P9-02-1-957) began in March 2017. Flow Metering (20 meters) was performed 3/28/17 - 6/30/17. Metering / infiltration analysis / flow isolation and CCTV inspection work completed. Wastewater data analysis and report preparation is ongoing.

The Town awarded a sewer repair contract to National Water Main and Cleaning Company. The following repair work was completed by NWM in the Fall 2017: twelve sewer manhole covers adjusted and/or replaced; twelve sewer main segments repaired by joint testing and sealing; fifty-one sewer service connections tested with twenty sewer service connections sealed; and eleven sewer manholes repaired by leak seal and patch. The estimated peak I/I removed from these repairs was estimated to be approximately 90,600 gpd.

MWRA I/I Local Financial Assistance Program: The community has financed seven (8) I/I reduction projects through the Authority's funding assistance program. Of the $3,818,500 allotted through the Program's Phases 1 - 13, the community has $2,076,050 remaining in funding assistance.

3. BEDFORD: North System

Background Information:
- Miles of Sewer: 78
- Sewered Population: 13,394
- Three Year (CY15 - CY17) Annual Average I/I: 1.12 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: Entegris Sewer Evaluation Final Report (January 2012)
Phase #3 Sewer System Investigation (October 2016)
Phase #4 Sewer System Investigation (October 2016)
Phase #5 Sewer System Investigation (May 2018)

Private Source Inflow Removal Program: No additional inspections were reported this period. Smoke testing which was conducted as part of the Sewer System Investigation Project #3 identified several private Inflow sources. These sources are expected to be removed in an upcoming sewer rehabilitation project.

I/I Rehabilitation Projects in Design or Construction: The Construction of the Phase #3 Sewer Rehabilitations, which began in April 2016 (bid opening) has been completed. The warranty inspection which was conducted in March 2017, found some rehabilitation work which needed to be corrected. A second warranty inspection will be performed in spring 2018.

Reporting Period Activity: The Phase #5 Sewer System Evaluation and Survey Report was completed in May 2018. An estimated 65,952 gpd of infiltration and 68,743 gpd of inflow was identified.

The town-wide Force Main Evaluation and Prioritization is ongoing. Phase II work will begin in Summer 2018.

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the $5,654,600 allotted through the Program's Phases 1 - 13, the community has $3,655,000 remaining in funding assistance.

4. BELMONT: North System

Background Information:
- Miles of Sewer: 78
- Sewered Population: 24,927
- Three Year (CY15 - CY17) Annual Average I/I: 1.11 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: I/I and Comprehensive Flow Monitoring Project Final Report (July 2009)
Sewer System Evaluation Survey Final Report (October 2009)
Preliminary Design Report – Investigations of Sewers to Identify I/I Report (January 2013)

Private Source Inflow Removal Program: The Town continues to work with potential developers in implementing a program that either removes I/I at rate of 5 to 1 or makes a one time payment to the Town to fund community I/I removal work.

No building inspections were performed during the past year.

I/I Rehabilitation Projects in Design or Construction: The Town has inspected approximately 24,000 LF of sewer and storm drain associated with the Town's 2018 Pavement Management Program (PMP). Point repairs, service replacements and full length replacements will be conducted on structural defect within the PMP limits in the Spring of 2019. Additional future trenchless repairs will be conducted to complete the recommended repairs.

Reporting Period Activity: The Town has continued with the comprehensive storm water sampling program, beginning in 2017. The sampling results have facilitated sewer and storm drain dyed-water testing and CCTV inspection to identify defects requiring repair. One repair has been completed and several additional repairs are scheduled. Future repairs will continue as defects are identified.

MWRA I/I Local Financial Assistance Program: The community has financed five (5) I/I reduction projects through the Authority's funding assistance program. Of the $8,255,100 allotted through the Program's Phases 1 - 13, the community has $5,263,000 remaining in funding assistance.

5. BOSTON: North and South Systems

Background Information:
- Miles of Sewer: 858
- Sewered Population: 645,320
- Three Year (CY15 - CY17) Annual Average I/I: 25.55 mgd
- MassDEP Administrative Actions: None (Cooperative Agreement Exists)

Boston North is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Boston North are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Reports: City-Wide I/I Analysis; Dorchester SSES; West Roxbury Low Level Sewer I/I Study; Roxbury Canal Sewer Separation Study; Upper Neponset Valley Sewer Inflow Survey; Granite Avenue I/I Survey; Dorchester High Level Sewer I/I Survey; Lower Dorchester Brook Sewer Study; and Longwood Medical Area I/I Survey.

Private Source Inflow Removal Program: Since 1994, the Downspout Disconnection Program has conducted approximately 38,000 building surveys and 10,500 dye water tests. Approximately 25,167 downspouts have been disconnected. During CY05 - CY18, a total of seventy-five (75) large impervious areas were surveyed to identify inflow sources. All seventy-five (75) areas have been dye tested. During this reporting period, private inflow sources at Nos. 55 & 75 Morrissey Boulevard (Dorchester) have been removed.

I/I Rehabilitation Projects in Design or Construction: BWSC has both completed and is currently working on a wide variety of separation and I/I identification/rehabilitation projects. To date, eighty-one (81) projects have received funding through the MWRA I/I Local Financial Assistance Program. During FY07 - FY18, BWSC completed the following MWRA-financed rehabilitation projects: Dudley Square Sewer Separation; Fairfield Street Sewer Rehabilitation; Rehabilitation of Sewers in the Fenway (Audubon Circle / St. Mary's Street Area); A Street Area Sewer Separation (South Boston Gillette Headquarters); Mass Ave - Dorchester Separation (New Market Square Area); East Boston (Border/Meridian Street Area) Sewer Separation; Sewer Rehabilitation in Back Bay/Kenmore/Hyde Park/ Mattapan; Albany Street Sewer Separation; Sewer Rehabilitation in Dorchester/Mattapan/West Roxbury/Brighton; Talbot Avenue High Level Sewer Area Sewer Replacement/Manhole Rehabilitation; South End Sewer Rehabilitation; Marginal Street Sewer Separation; St. Botolph Street Sewer Separation; Maverick Street Sewer Separation; West Side Interceptor and Public Garden Lining; Back Street Sewer Separation and Chester Park Area Sewer Separation.

On-going rehabilitation projects include: Mass Ave - Lower Roxbury Separation (New Market Square Area) and Upper Roxbury Area Sewer Separation (Phase 2).

BWSC entered into an I/I reduction agreement with the Massachusetts DEP in January 1986. As provided in the agreement, BWSC has performed a Phase II SSES on separated sewer areas within the City. BWSC also has an ongoing tide gate/regulator inspection and repair program and performs separation projects on pockets of combined sewers tributary to separated sewer areas.

Reporting Period Activity: BWSC is required to report to the EPA on I/I reduction measures under their NPDES permit. This reporting requirement coincides with the MWRA's required submittal dates; therefore, please refer to the BWSC NPDES report for a summary of activities during this period.

MWRA I/I Local Financial Assistance Program: The Commission has financed eighty-one (81) I/I identification/ reduction projects through the Authority's funding assistance program. Of the $218,001,200 allotted through the Program's Phases 1 - 13, the Commission has $125,322,794 remaining in funding assistance.

6. BRAINTREE: South System

Background Information:

- Miles of Sewer: 140
- Sewered Population: 36,573
- Three Year (CY15 - CY17) Annual Average I/I: 3.20 mgd
- MassDEP Administrative Actions: ACO-NE-01-1001 (April 2001)
  ACO-NE-99-1001 (March 1999)
  NON (May 1997)
  NON (October 1986)
  Amended AO Docket No. 546 (February 1985)

Latest I/I or SSES Report:
Annual Town-Wide Sewer Program – Yr 2 Investigation (January 2014)
Annual Flow Monitoring Project (January 2015)
Annual Town-Wide Sewer Program – Yr 3 Investigation (March 2015)
Annual Town-Wide Sewer Program – Yr 4 Investigation (February 2016)
Annual Town-Wide Sewer Program – Yr 5 Investigation (January 2017)
Annual Flow Monitoring Project (April 2018)
Annual Town-Wide Sewer Program – Yr 6 Investigation (January 2018)
Annual Town-Wide Sewer Program – Yr 7 Investigation (Ongoing)

Private Source Inflow Removal Program: Sump pump removal program is ongoing. Ten (10) private source sump pump removal contracts have redirected 295 sump pumps to date. Developer Flow Reduction Program is now 6 to 1 per DEP ACO. During CY13/14, a sump pump amnesty letter was sent out with the Town's annual water report to all users. The letter resulted in 31 customer calls to have their connections checked. To date, 27 inspections have taken place and nine (9) sump pumps have been identified for removal. Actual removal/rerouting of the sump pumps has not yet taken place.

I/I Rehabilitation Projects in Design or Construction: Year 7 I/I Investigation (Study) work in Subareas C3 / L6 / L7 / T1 began March 2018 and will be completed in August 2018. Summary Report will be completed January 2019 (MWRA Project No. WRA-P9-06-3-981). Rehabilitation design to begin Summer 2018. Rehabilitation construction contract likely out to bid Sumer 2019.

Year 6 I/I Investigation (Study) work in Subareas A2 / L3 / L5 began March 2017 and was completed in July 2017. Summary Report completed January 2018. Annual I/I Removal Program (Year 6) rehabilitation design (MWRA Project No. WRA-P9-06-3-961) is ongoing. Year 6 Rehabilitation Construction scheduled to be bid Fall 2018. The Year 6 project is estimated to remove 0.30 mgd of peak infiltration from the Town's sewer system.

Annual I/I Removal Program (Year 5) design (MWRA Project No. WRA-P9-06-3-941) was completed June 2017. Year 5 Rehabilitation Construction (Braintree Contract S17-1) was bid July 2017 with Warranty Retesting work scheduled for Fall 2018. The Year 5 project is estimated to remove 32,040 gpd of infiltration from the Town's sewer system.

Annual I/I Removal Program (Year 4) design (MWRA Project No. WRA-P9-06-3-915) was completed June 2016. Year 4 Rehabilitation Construction (Braintree Contract S16-1) was bid August 2016 with Warranty Retesting work completed Fall 2017. The Year 4 project is estimated to remove 27,929 gpd of infiltration from the Town's sewer system.

Reporting Period Activity: Town-Wide Annual Wastewater Flow Monitoring began January 2018 and will be complete December 2018. Summary Report to be developed January 2019 through June 2019 (MWRA Project No. WRA-P9-06-1-975).

MWRA I/I Local Financial Assistance Program: The community has financed thirteen (13) I/I reduction projects through the Authority's funding assistance program. Of the $14,419,000 allotted through the Program's Phases 1 - 13, the community has $6,938,200 remaining in funding assistance.

7. BROOKLINE: North and South Systems

Background Information:

- Miles of Sewer: 111
- Sewered Population: 59,069
- Three Year (CY15 - CY17) Annual Average I/I: 3.11 mgd
- Mass DEP Administrative Actions: None

Brookline is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Brookline are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Report:

Sewer Evaluation Survey in Subareas NI-7, 8 & 12 Final Report (May 2012)
Results for Condition Survey – Subareas NI-7, NI-8 & NI-12 Technical Memo (August 2012)
Eliot Street Smoke Testing Technical Memo (January 2013)
Englewood Ave/Kilsyth Road Sewer Alternative Evaluation Technical Memo (February 2013)
Wastewater Master Plan Update (December 2013)
Results for Sewer Condition Survey in Subareas NI-9, NI-10 & NI-11 Technical Memo (September 2014)

Private Source Inflow Removal Program: Town is in the process of developing a Private Flow Source Identification and Removal Program. A 4:1 Flow Reduction is enforced for large residential and commercial projects. The community is continuing its public outreach for private inflow identification/removal. Engineering Division personnel are on the lookout for illicit sump pumps during inspections.

The Town has completed its contract (PW/15-10) and has determined a few sewer services may have sump pumps connected to their sewer. The Town is working on the exact policy for removal private inflow sources in the sewer use regulations that still

needs Town meeting approval. The Town's long term plan is to CIPP all the public sewer mains and epoxy line all public SMH's in the Town. After the Town has completely rehabilitated its sewer system in a particular basin, the Town will then address suspected private inflow sources.

I/I Rehabilitation Projects in Design or Construction: Construction of Contract #PW/15-10 Recommended Sewer Rehabilitation in Subareas NI-8, NI-9, NI-10 & NI-11, which was awarded to D'Allessandro Corp. on September 17, 2015, is complete.

Reporting Period Activity: See Above information in Private Inflow Removal Program and I/I Rehabilitation Projects in Design or Construction paragraphs.

MWRA I/I Local Financial Assistance Program: The community has financed eight (8) I/I reduction projects through the Authority's funding assistance program. Of the $21,355,200 allotted through the Program's Phases 1 - 13, the community has $13,689,000 remaining in funding assistance.

8. BURLINGTON: North System

Background Information:

- Miles of Sewer: 115
- Sewered Population: 24,826
- Three Year (CY15 - CY17) Annual Average I/I: 1.18 mgd
- MassDEP Administrative Actions: ACO-NE-15-1N001 (October 2015)
  ACO-NE-06-1N001 (March 2006)
  ACO-NE-01-1004 (July 2001)
  Amended AO Docket No. 618 (October 1986)

Latest I/I or SSES Reports:

Easement Manhole Inspections & Flood Plain Manhole Inflow Investigations Final Report (August 2011)
Phase 5 Smoke Testing, Dye Testing & Dye Flooding Final Report (January 2012)
Phase 5 Sanitary Sewer Flow Evaluation and Recommendations Final Report (January 2012)
Phase 6 Sewer System Evaluation Survey Final Report (January 2012)
Building Inspections in the Phase 6 Area Final Report (June 2012)
Project 7 – Evaluate Sewer Flows Based on Water Use & SCADA Pump Station Data Report (Fall 2013)
Project 7 – Evaluation of Localized Flooding Areas Final Report (February 2014)
Project 7 – Building Inspections Final Report (March 2014)
Project 7 – Sewer System Evaluation Survey Final Report (March 2014)
Evaluation of Sewer Flows Based On SCADA Pump Station Data & Water Use Data – Project 7 (December 2014)
Project 8 Sewer System Evaluation Survey (Ongoing)

Private Source Inflow Removal Program: No house-to-house inspection investigations were conducted over the last year. Twenty-five (25) properties totaling thirty (30) illicit sewer connections were redirected from the Town's sewer system.

The Town's sewer connection fund balance (5 for 1 sewer connection fee) is $1,052,881.

I/I Rehabilitation Projects in Design or Construction: Construction of Sewer Rehabilitations Downstream of Terrace Hall Force Main Discharge project was substantially completed September 2017. Warranty Retesting work is ongoing.

Construction of Project 6 and 7 Sewer Rehabilitations was substantially completed August 14, 2017. Warranty Retesting work is ongoing.

Construction of Lucaya Circle Pump Station and Force Main Rehabilitations was substantially completed April 2017. The project is currently in the close-out phase.

Reporting Period Activity: See Above information in Private Inflow Removal Program and I/I Rehabilitation Projects in Design or Construction paragraphs.

MWRA I/I Local Financial Assistance Program: The community has financed twelve (12) I/I reduction projects through the Authority's funding assistance program. Of the $8,432,000 allotted through the Program's Phases 1 - 13, the community has $3,330,000 remaining in funding assistance.

9. CAMBRIDGE: North System

Background Information:
- Miles of Sewer: 148
- Sewered Population: 107,278
- Three Year (CY15 - CY17) Annual Average I/I: 5.52 mgd
- Mass DEP Administrative Actions: NON-NE-00-1012 (May 2000)
  NON-NE-00-1004 (January 2000)
  ACOP-NE-96-1004

Cambridge is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Cambridge are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Reports: Phase II: Analysis and Fast Track Design of I/I Rehabilitation Projects (December 2007)
East Cambridge Sewer Capacity Program (January 2013)
Area 4 Infrastructure Improvements and Kendall Square Sewer Assessment (July 2015)
DEP Report on Cambridge I/I Management Program (December 2017)

Private Source Inflow Removal Program: The City has completed house to house inspections in the Willard Street catchment area. This work was done as part of the design of a new stormwater outfall to the Charles River. Construction of the stormwater outfall is expected in 2018.

The City will also be performing house to house inspections in a portion of the Cambridgeport catchment area in advance of the construction of a new stormwater outfall at Talbot Street. These inspections will start in 2018.

The City is currently performing an IDDE project in the Cambridgeport catchment area including cleaning and inspection of the drainage system, building inspections, dye testing, and sampling. Identified illicit connections will be removed by Fall 2018. This project is in advance of the construction of a new stormwater outfall at Talbot Street. An illicit connection has been removed at 201 Vassar Street and another illicit was identified at 744 Massachusetts Ave and will be removed this fall.

The City continues to work with developers on I/I removal projects triggered by increased sewer flows greater than 15,000 gpd on new development projects. I/I removal projects are currently in progress for developments at: 399 Binney Street, the North Point Development, the Mass & Main Development, 47 Bishop Allen Drive, 203 Concord Turnpike, 50 Cambridge park Drive, 75 Fawcett Street and 55 Wheeler Road.

I/I Rehabilitation Projects in Design or Construction: see list below.

Reporting Period Activity: Listed below are on-going construction projects with direct or indirect I/I mitigation:
- Talbot Street storm drain and outfall, estimated completion January 2020
- Willard Street sewer separation and re-establishment of the stormwater outfall, estimated completion January 2020
- Binney Street Sewer Separation (Contract 9a&b by Divco), estimated completion February 2019
- Monsignor O'Brien (MOB) Phase 1 sewer separation on MOB, estimated completion August 2019
- Monsignor O'Brien (MOB) Phase 2a (Lechmere canal outfall), estimated completion August 2019
- Parking Lot 6 (PL6) stormwater tank, estimated completion August 2020.
- I/I investigations in Erie & Endicott systems, estimated completion September 2018
- Cottage/Lopez sewer separation, estimated completion January 2020
- First Street sewer separation (Boston Properties I/I), estimated completion November 2018
- In 2018, the City has installed 1000 LF of CIP pipelining in an effort to mitigate I/I, and has CCTV'd over 12,000 LF of sewers.
- The Newport Road, Roseland Street and Appleton Street project was completed in 2017. This project included replacement of sewer and drain on Newport Road and Roseland Street and partial replacement and CIPP lining of sewer and drain on Appleton Street between Highland Street and Brattle Street.

- Cambridge Crossing received an MWRA permit for a direct connection to the Cambridge Branch Sewer at Medford Street in Somerville. 1200 LF of force main and 800 LF of gravity sewer has been installed.
- The Wadsworth Street pump station was activated in May 2018 as part of the SoMa Development.

In November 2017, $6,502,545 in grant/loan funds were distributed for construction of the Port infrastructure improvements - Parking Lot 6 Stormwater Storage Tank and Combined Sewer Flow Reduction Project. Details of this project are included in Attachment 4 (WRA-P9-09-3-976).

MWRA I/I Local Financial Assistance Program: The community has financed nine (10) I/I reduction projects through the Authority's funding assistance program. Of the $39,250,100 allotted through the Program's Phases 1 - 13, the community has $21,670,500 remaining in funding assistance.

10. CANTON: South System

Background Information:
- Miles of Sewer: 62
- Sewered Population: 15,088
- Three Year (CY15 - CY17) Annual Average I/I: 1.31 mgd
- MassDEP Administrative Actions: AO Docket No. 537 (April 1984)

Latest I/I or SSES Report: Comprehensive Water Resources Management Plan (February 2009)
I/I Five Year Management Plan (November 2011)
I/I Five Year Management Plan Update (Ongoing)

Private Source Inflow Removal Program: No additional inspections were reported during this period. Town has established an I/I Mitigation Fee for all new connections. Fee is paid based upon DEP flow rates at a 4 to 1 ratio.

I/I Rehabilitation Projects in Design or Construction: Sewer System Rehabilitation (Canton Contract No. 12-01S / MWRA Project No. WRA-P8-10-3-817) was performed within Sewer Subsections 1-12 / 17 and included sewer manhole sealing/restoration, sewer pipe testing and sealing, CIPP lining and joint testing/sealing. Project work is complete.

Reporting Period Activity: The Town replaced 250 LF of broken 8-inch VC sewer main on Washington Street (at Walnut Street). The Town also performed sewer main cleaning and TV inspection in Sewer Subsections 14 / 19 and sealed 25 manholes in various locations (ten cross country manholes were sealed along Route 138). The Town conducted a 12 week flow metering program within Subsystems 7/9/12/14/16/18/19/24 to identify areas with extraneous flows.

MWRA I/I Local Financial Assistance Program: The community has financed six (6) I/I reduction projects through the Authority's funding assistance program. Of the $6,635,900 allotted through the Program's Phases 1 - 13, the community has $3,960,000 remaining in funding assistance.

11. CHELSEA: North System

Background Information:
- Miles of Sewer: 41
- Sewered Population: 37,670
- Three Year (CY15 - CY17) Annual Average I/I: 1.86 mgd
- MassDEP Administrative Actions: NON #00004520 – May 10, 2018 Failed to submit I/I Analysis due 12/31/17
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-008 (March 2009)

Chelsea is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Chelsea are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Report: Investigation into Excessive Infiltration/Inflow & Exfiltration (November 2009)
Everett, Spruce & Second St Sewer & Drain Evaluation (October 2012)

Private Source Inflow Removal Program: The City began collecting Sewer Bank fees for redevelopment projects in CY13. The City has also begun a move toward the implementation of Green vs. Gray infrastructure to reduce the amount of stormwater discharged to combined sewers. Efforts to date have included requiring all redevelopment projects to utilize Low Impact Development and retain/infiltrate stormwater onsite, and incorporating green infrastructure into municipal projects (e.g., rain garden at Mace Housing Complex).

I/I Rehabilitation Projects in Design or Construction: See bullet list below:

- The Shurtleff Street Utility Improvement Project was complete in December 2017.
- Construction of the 2015 Pump Station upgrades was complete in May 2018.
- Construction of the Carter Street Drainage Pump Station Force Main Relocation Project was complete in June 2018.
- Construction of the Clark Avenue, Crescent Avenue, Tudor Street, and Lawrence Street Utility and Roadway Improvements Project was complete in fall 2017.
- Construction of the Phase V Gateway Center Infrastructure Improvements Project is underway.
- Construction of the Maverick Street Road and Utility Improvements is underway.
- The City plans to design improvements to drain and flood resiliency in the Island End River area, utility and road improvements in Beacham Street, utility and road improvements in Essex Street, and utility and road improvements in Broadway in FY 2019.
- A total of 16 point repairs were completed for the sewer systems during FY 2018.
- Cleaning of approximately 32,000 LF of sewer and drain was completed during the last year.

Reporting Period Activity: See list above.

MWRA I/I Local Financial Assistance Program: The community has financed thirteen (13) I/I reduction projects through the Authority's funding assistance program. Of the $11,760,100 allotted through the Program's Phases 1 - 13, the community has $6,209,000 remaining in funding assistance.

12. DEDHAM: South System

Background Information:
- Miles of Sewer: 95
- Sewered Population: 23,098
- Three Year (CY15 - CY17) Annual Average I/I: 1.46 mgd
- MassDEP Administrative Actions: AO Docket No. 547 (October 1985)

Latest I/I or SSES Report: 2013 Year One Inflow Investigation (March 2014)
2014 Smoke Testing Program (March 2015)
Town-Wide Flow Monitoring (November 2016)
Sewer System Hydraulic Flow Model Update (March 2017)

Private Source Inflow Removal Program: The Town adopted a sewer system enterprise fund at the May 2009 Town Meeting. A Municipal Buildings Inspection Program was undertaken to identify inflow sources. Inspections identified approximately 78,231 gpd of peak inflow. The Town removed the 78,231 GPD of peak inflow during CY15-17. The Town is also in the early stages of developing a private inflow removal policy.

Smoke testing was conducted within approximately 140,000 LF of sewer to identify potential inflow sources. Testing results indicated 27 inflow sources contributing approximately 78,231 gpd of peak design storm inflow. Of the 27 defects identified, six were located within the Town's ROW. These six defects were rehabilitated by the Town's DPW during CY14-CY17.

A Private Building Inspection was conducted within three of the Town's seven precincts. This program was promoted throughout the community as voluntary. The Town provided penalty amnesty to all residents/commercial property owners who participated. There were 3581 locations within the three precincts. Only 1510 property owners (42%) permitted inspections. Of the 1510 inspections performed, fifty-seven (57) direct and one (1) indirect inflow sources were observed (contributing 418,951 gpd of estimated peak inflow). These sources consisted of thirty-seven (37) sump pumps, one (1) floor drain, nine (9) interior open cleanouts, four (4) exterior open cleanouts, five (5) direct driveway drains, one (1) indirect driveway drain and one (1) roof leader. Due to low program participation, the Town is not going to perform private building inspections within the remaining four (4) precincts at this time. The Town is currently working on how best to revamp the program for better participation and reviewing the collected data for removal alternatives for the sources identified.

I/I Rehabilitation Projects in Design or Construction: The Town, as part of the 2018 Sewer Rehabilitation On-Call Services Project, completed the installation of 4353 LF of CIPP lining, 24 LF of short liners and 248 VF of cementitious manhole lining.

As part of the 2017 Sewer Rehabilitation On-Call Services Project, the Town completed the installation of 1905 LF of CIPP lining and 537 VF of cementitious manhole lining. The project removed an estimated 0.30 mgd of peak infiltration.

The community also continued its annual sewer system inspection program. In March 2017, the Town began cleaning and TV inspecting 120,000 LF of sewer main and performing top-side inspection of approximately 475 sewer manholes. The Town plans to utilize this data, along with previous year's backlog work, to perform CY18 rehabilitation on the most cost-effective sewer lines/ manholes utilizing an on-call rehabilitation contract.

Reporting Period Activity: Approximately 200 LF of sewer main extensions were installed throughout the Town by private developers. Upon completion of the extension projects, the Town took over ownership of the sewer mains.

MWRA I/I Local Financial Assistance Program: The community has financed sixteen (16) I/I reduction projects through the Authority's funding assistance program. Of the $9,220,000 allotted through the Program's Phases 1 - 13, the community has $3,480,000 remaining in funding assistance.

13. EVERETT: North System

Background Information:

- Miles of Sewer: 57
- Sewered Population: 42,935
- Three Year (CY15 - CY17) Annual Average I/I: 2.38 mgd
- MassDEP Administrative Actions: ACOP-NE-08-1N006 (July 2008) Resolution Pending
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-026 (August 2009)

Latest I/I or SSES Report:

Sanitary Sewer Overflow Abatement Plan – Behan & Beacham Street Area Final Report (December 2009)
I/I Investigation (July 2010)
Sanitary Sewer/Drain Investigation on Beacham Street (August 2012)
I/I Investigation (August - September 2013)
IDDE Citywide Report (February 2015)
Sewer Flow Monitoring Report (October 2016)
EPA Administrative Order Compliance Report (January 2017)
Lower Broadway I/I Investigation (Ongoing)
City-Wide I/I Investigation (Ongoing)

Private Source Inflow Removal Program: Sewer smoke testing has been scheduled for subareas EV-3C. Awaiting system inspection from vendor prior to smoke testing EV-4C, EV-5C, and EV-CH2 subareas which are scheduled next.

I/I Rehabilitation Projects in Design or Construction: The Otis, Henderson & Bow Streets Sewer Replacement Project was completed. The City-wide Catch Basin Redirection Project is ongoing.

Reporting Period Activity: The Draft Report for the Sewer System Metering Project has been completed.

Mitigation projects for the Encore Casino site include drainage improvements in the Lower Broadway neighborhood including Route 99 - Broadway, Dexter Street and Robin Street. Improvements include disconnections and installation of deep sump catch basins.

The Rivergreen Subdivision (permitted in the late 1990's) was finally built-out to support relocated commercial properties from the Lower Broadway neighborhood. Improvements include deep sump catch basins and stormwater detention ponds.

An Updated (Draft) Sanitary Sewers and Drains ordinance has been completed and is on the City Council Agenda. Included is establishment of an I/I Reduction Fund with the following fee structure for new construction:

Design flow of 500 to 1500 gpd, a onetime fee of $2500.

Design flow of greater than 1500 gpd, either perform 4:1 I/I removal or pay a fee of $7.50 per gallon of new design flow.

MWRA I/I Local Financial Assistance Program: The community has financed nine (9) I/I reduction projects through the Authority's funding assistance program. Of the $13,381,500 allotted through the Program's Phases 1 - 13, the community has $6,731,000 remaining in funding assistance.

14. FRAMINGHAM: South System

Background Information:

- Miles of Sewer: 275
- Sewered Population: 67,680
- Three Year (CY15 - CY17) Annual Average I/I: 2.38 mgd
- MassDEP Administrative Actions: ACO-NE-07-1N001 (March 2007)
  AO Docket No. 592 (January 1986)

Latest I/I or SSES Report: Town-Wide I/I Study / SSES Phase 1 / CWMP (Complete)
SSES Phase 2 (Complete); SSES Phase III (Complete)
SSES Phase IV / V (Complete); Blackberry Lane SSES (Complete)

Private Source Inflow Removal Program: The Town's ten year capital plan now includes three phases of inflow removal projects. The first phase was financed in the FY17 budget cycle. The Town is currently developing capital projects that will incorporate the removal of the illicit connections identified during the field reconnaissance efforts of the SSES programs. The capital project program will include the redirection of illicit flows as well as the extension of storm drain systems to remove flow from the sewer system. During this year's capital project development cycle, the Town will determine the proposed rehabilitation areas and improvements required in order to further refine the costs and timing of the actual inflow removal projects. The Town has begun drafting the scope of work for this first phase of projects.

The City has submitted an updated inflow removal scope of work and schedule to MassDEP for their review and approval. The plan includes working with City government to develop and initiate a program for sump pump and other inflow source (i.e., roof and area drains) removal. This work will be included as part of the FY20 capital budget request for the City's Phase 6 SSES project. As noted last year, the City has an ongoing phased pipeline and manhole rehabilitation design and construction program addressing high priority defects identified in previous SSES investigations. Phase 1 is complete, Phase 2 is ongoing and Phase 3 is included in the FY20 capital budget request.

The Town conducted dye testing of roof leaders on three condominium buildings located at 1321-1325 Worcester Road and found them to be directly connected into the sanitary system. The roof's overall surface area is 43,125 sf. Inflow volume generated from these sources (from a one year, six hour design storm) is approximately 42,000 gpd.

I/I Rehabilitation Projects in Design or Construction: The Union Avenue Area Sewer Improvements Phase 1 Project (Framingham Contract PW 320 / MWRA Project No. WRA-P9-14-3-953) is scheduled for completion Summer 2018. Project work included the replacement of 950 LF of 8-inch sewer main; replacement of 1520 LF of sewer service laterals; CIP lining of 1700 LF of 8-inch sewer main; CIP lining of 120 LF of 15-inch sewer main and the replacement of 24 sewer manholes. The project's work area includes: Union Avenue / Walnut Street / Neville Road.

The Main Street Area Sewer Improvements Project (Framingham Contract PW 291 / MWRA Project No. WRA-P9-14-3-920) was completed June 2016. Project work included the replacement of 1460 LF of 8-inch sewer main; replacement of 450 LF of sewer service laterals; CIPP lining of 2750 LF of 8-inch sewer main and the replacement of 24 sewer manholes. The project's work area included: Main Street / Granite Street / Moulton Park Road / Maple Street.

The Central Street Siphon / Sudbury River Interceptor Project consisted of CIPP lining 4000 LF of 18-inch sewer in a wetland area of the Sudbury River and the replacement of 4000 LF of 8-inch sewer with an 18-inch interceptor. The new configuration eliminated two siphons under the Sudbury River and a bottleneck that had generated a seasonal sanitary sewer overflow. Project work is complete.

Reporting Period Activity: The existing 6-inch VC sewer (circa 1940) on Washakum Boulevard was replaced with 590 LF of 8-inch PVC. The existing 6-inch VC sewer (circa 1944) on Guild Street was replaced with 610 LF of 6 and 8-inch PVC. The existing 8-inch VC sewer (circa 1956) on Picard Terrace was replaced with 200 LF of 8-inch PVC. The existing 6-inch VC

sewer (circa 1916) on Rhubena Street was replaced with 177 LF of 6-inch PVC. The Town also completed sewer realignment projects within the Shawmut Hancock Pump Station area (1729 LF of sewer replaced and 150 LF of sewer CIP lined) and Fountain Street (2410 LF of sewer CIP lined).

Town forces / on-call service providers performed 52 open trench repairs, installed 53 short liners, tested and sealed sewer main at 16 locations and rehabilitated 94 sewer manholes.

MWRA I/I Local Financial Assistance Program: The community has financed thirteen (13) I/I reduction projects through the Authority's funding assistance program. Of the $20,375,000 allotted through the Program's Phases 1 - 13, the community has $13,119,090 remaining in funding assistance.

15. HINGHAM: South System

Background Information:
- Miles of Sewer: 33
- Sewered Population: 6,809
- Three Year (CY15 - CY17) Annual Average I/I: 0.73 mgd
- MassDEP Administrative Actions: AO Docket No. 536 (November 1985)

Latest I/I or SSES Report:
FY14 I/I Evaluation (January 2014)
FY15 I/I Evaluation (April 2104)
FY15 Evaluation Amendment 1 (November 2014)
2015 Town-Wide Flow Metering (February 2015)
FY16 Evaluation (December 2015)
FY17 Evaluation Year 1 (December 2017)
2017 Inflow Investigations (December 2017)
FY18 Evaluation Year 2 (Ongoing)

Private Source Inflow Removal Program: The house-to-house sump pump inspection and roof leader disconnection programs are ongoing. In CY17/18, approximately 500 homes were inspected for sump pumps. One sump pump was identified as being connected to the sanitary system. This sump pump has been removed.

I/I Rehabilitation Projects in Design or Construction:

FY16/17 Annual Sewer Program: Review TV inspection videos of approximately 27,000 LF of sewer main. Conduct topside physical survey of 174 sewer manholes. Identify sewer main/manhole defects to be repaired as part of On-Call I/I Rehabilitation Services Contract. FY16/17 Smoke Testing (150,000 LF) and Rehabilitation Construction (MWRA Project No. WRA-P9-15-3-934) work completed Summer 2018.

Reporting Period Activity: A 6 to 1 [@2.67/gallon] fee for new system flow has recently been implemented. The generated funds are earmarked for I/I identification and repair. Ship Street and Street Sewer Extensions are ongoing (total length of extension is approximately 1800 LF of PVC sewer pipe). Greenbush Pump Station sump pump rehabilitation completed Summer 2018.

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the $2,802,500 allotted through the Program's Phases 1 - 13, the community has $1,170,000 remaining in funding assistance.

16. HOLBROOK: South System

Background Information:
- Miles of Sewer: 31
- Sewered Population: 9,671
- Three Year (CY15 - CY17) Annual Average I/I: 0.34 mgd
- MassDEP Administrative Actions: ACOP-NE-04-1001 (Signed January 2005; Amended July 2007)
  (Amended ACO No. 2 May 2008)

Latest I/I or SSES Report: I/I Inspections Report (July 2006)
DEP ACO Progress Report (June 2008);
CWSRF No. 2919 Contract No. 1 (October 2009)

Private Source Inflow Removal Program: House-to-House inspections continue. All new home construction is inspected by the DPW and Town Plumbing Inspector. The State has approved the Town's Sewer Bank Policy.

I/I Rehabilitation Projects in Design or Construction: TV inspection was conducted on 10,500 LF of sewer in Sub-areas H(7) and H(8). Manholes inspections (300 total) were conducted primarily in Sub-areas A/F/G/H(8).

Reporting Period Activity: The Town has completed its yearly check of all cross-country sewer manholes. Plymouth Street System Extension has been completed. Abington Avenue sewer work has also been completed. Phase 3/4 properties associated with collection system expansion are now being connected at owner's request. Phase 5 System Extension (Spring Street Area) and Spring Street Pump Station work is complete.

MWRA I/I Local Financial Assistance Program: The community has financed two (2) I/I reduction projects through the Authority's funding assistance program. Of the $2,779,600 allotted through the Program's Phases 1 - 13, the community has $1,883,038 remaining in funding assistance.

17. LEXINGTON: North System

Background Information:

- Miles of Sewer: 170
- Sewered Population: 32,030
- Three Year (CY15 - CY17) Annual Average I/I: 2.27 mgd
- MassDEP Administrative Actions: ACO-NE-11-015 (July 2011)
- EPA Clean Water Act Administrative Order: EPA Docket No. 11-015 (July 2011)

Latest I/I or SSES Reports:

Annual Town-wide Sewer Investigation & Implementation Program Final Report (October 2011)
Sewer Basins 3, 9 & 10 Smoke Testing, Dye Testing & Dye Flooding Program Final Report (January 2012)
Sewer Use Code Review Final Report (February 2012)
Private Inflow Removal Program Final Letter Report (February 2012)
Sewer System Evaluation Survey - Phase III Final Report (April 2012)
Surcharged Areas Evaluation Final Report (April 2012)
Sewer System Evaluation Survey Phase 4: Sewer Basins 3 & 9 (May 2013)
Sewer System Evaluation Survey - Manhole Inspections in Sewer Basin 14 (August 2013)
Sewer System Evaluation Survey - Phase 5: Sewer Basins 4, 5 & 14 (May 2015)
Sewer System Evaluation Survey - Phase 6: Sewer Basins 2, 11 & 13 (March 2016)
Sewer System Evaluation Survey - Phase 7: Sewer Basins 8 & 12 (July 2017)
Sewer System Evaluation Survey - Phase 8: Sewer Basin 01 (January 2018)

Private Source Inflow Removal Program: The Town is using the February 2012 *Lexington Sewer Use Code Review* to update their current regulations to incorporate a sewer bank or other funding options that may be adopted by the town.

A private inflow program based on the February 2012 Private Inflow Removal Program Letter Report is currently on hold.

I/I Rehabilitation Projects in Design or Construction: Final paving at three open cut point repairs on Massachusetts Avenue was performed to complete the Warranty Inspection for Phase 5 Sewer System Improvements for Sewer Basins 4, 5 & 14 (Contract #16-35).

The Sewer System Evaluation Survey for Sewer Basins 2, 11 & 13 (Phase 6) Final Report was completed in October 2016. The project identified approximately 200,000 gpd of removable peak infiltration. The design for the recommended rehabilitations is being drafted and is scheduled for public bid in Fall 2018.

The Sewer System Evaluation Survey for Sewer Basin 01 (Phase 8) was completed in January 2018. This project identified approximately 50,000 gpd of removable peak I/I in the 105,500 LF of sewer main.

The Dunback Meadow and Mill Brook Sewer Improvements construction started in Winter 2017 and was substantially completed on May 15, 2018. This project goal was to remove I/I associated with multiple structural defects identified in the Dunback Meadow, Mill Brook and Valley Road areas.

Reporting Period Activity: Ten (10) units were connected to the Town's sewer system in April and May of 2018. This connection was made near the property of 163 Cedar Street. This connection will be made east of I-95 in Sewer Basin 08. Four separate homes were connected to Town sewer system as a result of septic abandonment.

The following change to the Sewer Use Code is currently being implemented. This proposed change requires approval by the Board of Selectmen.

Section 181-44 (G)

Capacity Fee

All new connections greater than 15,000 gpd to the municipal sanitary system shall be charged a one-time Capacity Fee in accordance with the following fee schedule:

Required Fee

Applicant must remove four (4) gallons of I/I from the sewer system for each one gallon of permitted wastewater flow requested (Title V (310 CMR 15) shall be used to determine flow rates).
If there are no sources of I/I which, at the discretion of the town, are appropriate for removal at the time of the permit, a monetary fee may be required.

The fee shall be calculated based on Title V flows and a cost of the Town of Lexington's existing transportation and treatment (T&T) cost per gallon of flow per day (gpd). This transportation and treatment cost is calculated yearly and must be approved by the Town Engineer. Please contact the Town Engineer to confirm the current transportation and treatment cost.

For example, if a development has an associated Title V flow of 15,000 gpd, the fee for this connection is 15,000 gpd x T&T Cost x 4). All dollar values shall be rounded up to the nearest fifty dollars ($50).

A combination of I/I removal and monetary fees may also be negotiated at the discretion of the town. Any I/I removed from the sewer system as part of this program shall be the property of the Town of Lexington and may not be applied to future removal requirements without the written authorization of the town.

MWRA I/I Local Financial Assistance Program: The community has financed eleven (11) I/I reduction projects through the Authority's funding assistance program. Of the $12,125,300 allotted through the Program's Phases 1 - 13, the community has $4,680,000 remaining in funding assistance.

18. MALDEN: North System

Background Information:

- Miles of Sewer: 100
- Sewered Population: 60,206
- Three Year (CY15 - CY17) Annual Average I/I: 3.32 mgd
- MassDEP Administrative Actions: NON #00004556 – May 9, 2018 Failed to submit I/I Analysis due 12/31/17
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-002 (January 2009)

Latest I/I or SSES Report: Malden Sewer System Evaluation Survey (Phase III) Final Report (December 2011)
Hydraulic Model and Capacity Assessment Draft Report (June 2012)
Hydraulic Model and Capacity Assessment Final Report (December 2012)

Private Source Inflow Removal Program: No additional inspections were reported. The City continues to monitor potential private inflow sources.

I/I Rehabilitation Projects in Design or Construction: No sewer rehabilitation projects or significant sewer maintenance activities over this reporting period. However, the City plans to contract with an engineering firm to design a comprehensive I/I and sewer flow analysis, including a flow metering program, and other means of identifying I/I. The contracted engineering consultant will begin a study over the Winter 2018/2019, with implementation of the study occurring in the Spring 2019. Upon completion of the study and analysis of the results, the City will design construction projects to remediate areas identified as problematic.

Reporting Period Activity: Malden submitted a Financial Assistance Application to MWRA for $1.048 million in June 2018. Funding for the City's project is anticipated in the Fall 2018.

City of Malden Engineering Department has prepared an action item for consideration by the City of Malden DPW Commission regarding the creation of Sewer System Inflow/Infiltration Removal Requirements and Sewer Mitigation Fee's. It has not yet been approved.

MWRA I/I Local Financial Assistance Program: The community has financed five (5) I/I reduction projects through the Authority's funding assistance program. Of the $20,683,900 allotted through the Program's Phases 1 - 13, the community has $16,090,000 remaining in funding assistance.

19. MEDFORD: North System

Background Information:

- Miles of Sewer: 113
- Sewered Population: 57,113
- Three Year (CY15 - CY17) Annual Average I/I: 2.86 mgd
- MassDEP Administrative Actions: NON-NE-00-1005
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-027 (August 2009)

Latest I/I or SSES Report:

Limited Sewer System Evaluation Survey of North Medford/Heights Area Final Report (July 2012)
Mini-System "P" Sewer System Evaluation Survey Study Final Report (June 2014)
Continuation of Sewer System Evaluation Survey of North Medford/Heights Area (October 2016)
Continuation of Mini-System "P" SSES (October 2016)
City-wide I/I Control Plan Metering Program (April 2018)

Private Source Inflow Removal Program: As part of the ongoing SSES studies and as recently requested by MassDEP, the development of a Private Inflow Source Removal Plan will be started in FY19.

I/I Rehabilitation Projects in Design or Construction: D'Allessandro Corp. is finishing Year 3 of a three-year sewer rehabilitation contract (as of 7/31/18). In Year 3, over 1100 LF of defective sewer main has been replaced and five additional manholes rehabilitated. Finishing out the contract is the CIPP lining of 1200 LF of 8 and 12-inch sewer main.

Catch Basin removal in North Medford is complete with only the warranty period and punch list items remaining.

The SSES – Phase 2 Study in North Medford is complete and is currently being reviewed by the City.

The SSES – Phase 2 Study in Mini-System P is complete and is currently being reviewed by the City.

The Design of the Sewer Rehabilitations recommended by the SSES – Phase 1 Study in Mini-System P is near completion with final revisions to contract documents nearly completed. It is anticipated that the contract will be ready for bid by August 30, 2018.

Reporting Period Activity: Currently the City is waiting on two proposals from developers for an inflow removal (catch basin) project recommendation in Mini-System G and a sewer rehabilitation plan for I/I removal in Mini-System F (4:1 reduction). The work in Mini-System F is scheduled to start in 2019.

In May 2018, $1,047,000 in grant/loan funds were distributed from MWRA for the Mini-System P Sanitary Sewer Rehabilitation Construction and the City-wide I/I Metering Program. Details of these projects are included in Attachment 4. The estimated peak infiltration removal for the sewer rehabilitation is 0.51 mgd (MWRA Project No. WRA-P9-19-3-983).

MWRA I/I Local Financial Assistance Program: The community has financed eight (8) I/I reduction projects through the Authority's funding assistance program. Of the $19,637,600 allotted through the Program's Phases 1 - 13, the community has $11,676,000 remaining in funding assistance.

20. MELROSE: North System

Background Information:

- Miles of Sewer: 74
- Sewered Population: 27,662
- Three Year (CY15 - CY17) Annual Average I/I: 2.08 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report:

I/I Rehabilitation Project Recommendations (November 2001)
Summary Letter Report for Sewer System Investigations - Subareas 21 & 22 (May 2014)
Summary Letter Report for Sewer System Investigations & Mapping (August 2014)
City-wide I/I Flow Metering (December 2016)
Sewer System Investigation and Evaluation (Spring 2017)
2017 Sewer Rehabilitation Project - CIPP Lining (Winter 2017)
2018 Sewer Rehabilitation Project - Open Cut Repairs (Fall 2018)

Private Source Inflow Removal Program: Smoke testing was performed in the five subareas where investigations were done. A number of potential private inflow sources were discovered. In addition to those discovered through smoke testing, other potential sources of private inflow were discovered while doing post-CIPP flow isolation. These will be investigated in the near future.

I/I Rehabilitation Projects in Design or Construction: In Spring 2016, sewer flow metering was performed Citywide, with 29 meters operating for 10 weeks. Groundwater and rainfall monitoring were also performed during this period. The flow metering report was completed in December 2016. The data summarized in this report were used to select the top five subareas for follow-up SSES work (which was performed in 2017). Work performed in the past year has targeted repairs identified during the SSES project, as follows:

- Over the past year the City has started and nearly completed the installation of CIPP liners in approximately 33,500 LF of sewer main identified from the 2017 investigatory work as cost-effective segments with the most infiltration. This work will lead to a conservatively estimated 200,000 GPD reduction in infiltration, based on post-construction flow isolation, conducted in Spring 2018.

- Based on the results of the 2017 SSES, the next project will be to conduct open-cut repairs in the various sewer pipes throughout the first five subareas investigated, in locations where trenchless rehabilitation was not deemed feasible or advantageous. Design plans and specifications suitable for public bidding are being finalized for this open-cut work. The design will be completed in August 2018, bidding and award will be in September 2018 with construction to follow.

- Other work anticipated to be completed during Fall 2018 includes: Additional sewer manhole rehabilitation (installation of cementitious liners) to manholes in the first five subareas investigated. Also, additional flow metering in Subarea 15 (top priority area for inflow as identified during the 2016 Flow Metering Program) for approximate 10 week period.

Reporting Period Activity: In June 2016, the Board of Aldermen voted in favor of an ordinance to increase the City's infiltration and inflow mitigation fee from $2.14 per gallon per day (gpd) to $6.89/gpd. This revised cost reflects the actual cost of the Subarea 21 and 22 project per gpd of I/I removal, accounting for design, construction, and construction administration costs. This fee is now being routinely charged to all projects for which a Title 5 flow increase is apparent from the building permit application. In 2017, the City instituted a process with the Inspectional Services Department to ensure

that I/I fee reviews are occurring for all applicable projects. During FY18, the City collected $133,838 in I/I mitigation fees through this mechanism, which is kept in a dedicated fund and is only used for work related to I/I reduction.

No new sewer extensions initiated by the City have been conducted in the last year or are planned at this time. The following private developments have either recently tied into the City's or MWRA's sewer system or have been approved to so:

- A development under construction off of Dexter Road, referred to as Stone Ridge Heights and/or Regan's Way, will include eight new residential lots accommodated by new 8-inch PVC sewers. The new sewer main has been installed and half of services are now active.
- Blueberry Hill Lane, formerly referred to as Indian Rock Road (located off Forest Street), is a development presently under construction with 19 townhouse units of residential housing. The sewer main has not yet been installed.
- An assisted living facility at 158 Essex Street (former Deering Lumber property) is complete and occupied. This project included 90 residential units and a direct connection has been made to the MWRA sewer main in Tremont Street.
- A new development at 10-14 Corey Street is under construction and will include approximately 40 new condominium units tying into the sewer system on Corey Street. While this does not involve a sewer extension, it is a substantial addition to the sewer flow on Corey Street. The contractor has installed a CIPP liner in 300 feet of sewer main on this street.

In November 2017, $1,081,000 in grant/loan funds were distributed from MWRA for the Construction of CIPP (2017) Sewer Rehabilitation Project and construction of the Open Cut (2018) Sewer Rehabilitation Project. Details of these projects are included in Attachment 4 (MWRA Project No. WRA-P9-20-3-979).

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the $10,126,300 allotted through the Program's Phases 1 - 13, the community has $4,050,000 remaining in funding assistance.

21. MILTON: South System (Small Portion Tributary to the North System)

Background Information:

- Miles of Sewer: 83
- Sewered Population: 26,534
- Three Year (CY15 - CY17) Annual Average I/I: 1.48 mgd
- MassDEP Administrative Actions: Amended AO Docket No. 580 (March 1986)

Latest I/I or SSES Report: I/I Town-Wide Sewer Evaluation – Year 10 (February 2015)
I/I Town-Wide Sewer Evaluation – Year 11 (February 2016)
I/I Town-Wide Sewer Evaluation – Year 12 (January 2017)
I/I Town-Wide Sewer Evaluation – Year 13 (December 2017)
I/I Town-Wide Sewer Evaluation – Year 14 (Ongoing)
Wastewater Capital Improvement Plan Priority Evaluation (Ongoing)

Private Source Inflow Removal Program: The Town is continuing to pursue the removal of sump pumps and other private inflow sources identified through a previously completed building inspection program. All new connections to the municipal sanitary sewer system will be charged a one-time I/I mitigation fee. Connection applicants must remove four gallons of I/I from the sewer system for each one gallon of new wastewater flow requested in the connection permit. If there are not sources of I/I that, at the discretion of the DPW Director, are appropriate for removal at the time of the permit, a monetary fee may be required (at a cost of $3.00 per gallon of flow per day to be removed). Also, a building inspection is performed during the final water meter reading when a house is being sold. If the building inspection identifies an illegally connected sump pump, a fine is issued and the house cannot be sold until the sump pump has been rerouted and inspected.

I/I Rehabilitation Projects in Design or Construction:

Year 13 Sewer System Infiltration Rehabilitation [MWRA Project No. WRA-P9-21-3-987 / Milton Contract S18-1] was bid in June 2018 with construction beginning in August 2018. Work will be performed in Subareas DI-02 / G-03A / G-03C / G-08D / G-09 / G-10A / G-10B / G-11D / S-01 / S-01A / S-07B / S-07D / S-08 and includes approximately: 15,300 LF of cleaning and television inspection; 9725 LF of testing and sealing of joints; installing 8600 LF of CIP pipe; installing 209 LF of CIP short liners; performing three open cut point repairs; cutting three protruding service connections; testing and grouting 161 service connections; rehabilitating 34 manholes; topside inspection of 43 sewer manholes; and performing 20,425 LF of post-construction flow isolation.

Year 12 Sewer System Infiltration Rehabilitation [MWRA Project No. WRA-P9-21-3-972 / Milton Contract S17-1] was bid June 2017. Construction began in August 2017. Work was performed in Subareas G-02A / G-03B / G-03D / G-09 / G-10A / G-16 / G-17 / G-19 / G-20 / S-01 / S-01A and included approximately 4370 LF of cleaning and TV inspection; 17,000 LF of testing and sealing of joints; performing 1075 LF of chemical root treatment; installing 5080 LF of CIP pipe; installing 230 LF of CIP short liners; cutting one protruding service connection; testing and grouting 110 service connections; rehabilitating 71 manholes; installing 12 manhole inflow dishes; replacing 4 manhole frames and covers; TV inspection of 4270 LF of sewer and topside inspection of 30 sewer manholes; and performing 22,000 LF of post-construction flow isolation. Year 12 Sewer System Infiltration Rehabilitation has reached substantial completion with Warranty Retesting work scheduled for Spring 2019. The Year 12 project is estimated to remove 56,376 gpd of infiltration from the Town's sewer system.

Year 11 Sewer System Infiltration Rehabilitation [MWRA Project No. WRA-P9-21-3-948 / Milton Contract S16-1] has reached substantial completion with Warranty Retesting work completed in Spring 2018. The Year 11 project is estimated to have removed 36,504 gpd of infiltration from the Town's sewer system.

Reporting Period Activity:

Year 14 I/I Rehabilitation Investigation (MWRA Project No. WRA-P9-21-3-987) was completed Spring 2018 (Subareas G-04 / G-06 / G-07 / G-11B / G-11E / PS-02 / PS-03 / S-17A / S-18). Work included cleaning, TV inspection, videotaping and recording 47,600 LF of sewer; conducting flow isolation on 45,500 LF of sewer; and performing topside manhole inspections of 270 sewer manholes. Data review and report preparation is ongoing

Year 13 I/I Rehabilitation Investigation (MWRA Project No. WRA-P9-21-3-972) was completed Spring 2017 (Subareas G-03A / G-03C / S-07B / S-07D / S-08). Data review/report preparation completed January 2018. CCTV inspection revealed an estimated 91,440 gpd of peak infiltration. Topside manhole inspection revealed an estimated 19,152 gpd of peak infiltration.

Year 12 I/I Rehabilitation Investigation (MWRA Project No. WRA-P9-21-3-948) began March 2016 and was completed June 2016. Summary Report completed January 2017. Flow isolation and TV inspection of 51,760 LF of sewers in Subareas G-02A, G-03B, G-03D, G-09, G-16, G-17, G-19, G-20, S-01 and S-01A revealed an estimated 105,552 gpd of peak infiltration. Topside inspection of 329 manholes revealed an estimated 22,176 gpd of peak infiltration and 88,408 gpd of peak inflow.

Year 11 I/I Rehabilitation Investigation completed Spring 2015. Data review/report preparation completed February 2016. TV inspection of 42,737 LF of sewer in Subareas G-08C, G-08D, G-10B, G-11D, G-13B and S-14 revealed an estimated 66,960 gpd of peak infiltration. Topside manhole inspection of 259 manholes revealed an estimated 22,032 gpd of peak infiltration.

Year 10 I/I Rehabilitation Investigation Report completed February 2015. TV inspection of 41,449 LF of sewer in Subareas G-08B, G-13 and G-25 revealed an estimated 130,320 gpd of peak infiltration. Topside manhole inspection of 205 manholes in revealed an estimated 37,152 gpd of peak infiltration.

Approximately 765 LF of 8-inch PVC sewers were added to Milton's sewer system in CY17/18 (400 LF to service one single-family home on The Ledgeway and 365 LF to service eight single-family homes on Jill Kathleen Lane).

MWRA I/I Local Financial Assistance Program: The community has financed nineteen (19) I/I reduction projects through the Authority's funding assistance program. Of the $9,014,500 allotted through the Program's Phases 1 - 13, the community has $4,364,000 remaining in funding assistance.

22. NATICK: South System

Background Information:
- Miles of Sewer: 137
- Sewered Population: 31,351
- Three Year (CY15 - CY17) Annual Average I/I: 0.92 mgd
- MassDEP Administrative Actions: AO Docket No. 593 (November 1985)

Latest I/I or SSES Report: Town-Wide SSES (Ongoing)

Private Source Inflow Removal Program: The SSES (MWRA Project No. WRA-P5-22-1-523) included a house-to-house inspection component. Home inspections are also conducted in conjunction with a water meter replacement program. The Town has prepared an informational handout on eliminating sump pump connections to the wastewater system, which is distributed to targeted/suspect areas of the community.

I/I Rehabilitation Projects in Design or Construction: The Three Year Sewer Rehabilitation Project (Natick Contract No. S-127 / MWRA Project Nos. WRA-P7-22-3-761/825) was bid June 2013. Rehabilitation Construction began October 2013 with completion of identified rehabilitation work in Fall 2017. The peak infiltration removed by this project was approximately 0.61 mgd.

Additional sewer rehabilitation work includes CCTV and chimney inspection program (MWRA Project No. WRA-P9-22-3-912). To date, 137,608 LF of CCTV inspection has been completed in Sewer Basins 6 / 11/ 14 / 16. Manhole inspections in Basin 11 will be completed Summer 2018. The chimney inspection program evaluates pre-1980 chimneys. Approximately 306 services meeting this criterion have been identified and inspected. The data obtained from these investigations is currently being reviewed to identify rehabilitation needs. The scope of rehabilitation work generated by the CCTV work, sewer manhole inspections, and sewer chimney inspections will serve as the base for the next three year sewer rehabilitation contract. Specifications and bidding documents are currently being prepared.

Reporting Period Activity: The Town has completed the purchase of the CCTV inspection vehicle (MWRA Project No. WRA-P9-22-1-966). Training on the equipment was recently completed and the vehicle is now available for use by the Town.

Extensions of the collection system: Heavey Estates (4 homes: 2 homes have tied in); Cider Mill Estates: One additional home was connected during the reporting period (three homes remain to tie in); Route 9/27 Plaza: Remodeling of existing Building 19 and Staples building to be multiple businesses. Increased flow is 3195 gpd (utilizing existing sewer connection); 31 South Main Street: Conversion of retail space to retail/residential apartments (addition of 32 units; increased flow is 5700 gpd).

MWRA I/I Local Financial Assistance Program: The community has financed ten (10) I/I reduction projects through the Authority's funding assistance program. Of the $9,332,600 allotted through the Program's Phases 1 - 13, the community has $4,719,000 remaining in funding assistance.

23. NEEDHAM: South System

Background Information:
- Miles of Sewer: 132
- Sewered Population: 28,089
- Three Year (CY15 - CY17) Annual Average I/I: 1.40 mgd
- MassDEP Administrative Actions: AO Docket No. 549 (November 1984)

Latest I/I or SSES Report: Town-Wide Infiltration/Inflow Report (October 2013)
Phase I I/I Investigation Report (June 2015)
Reservoir B Tributary Investigation (July 2015)
Phase II I/I Investigation Report (August 2016)
CCTV Inspection: Beech / Webster Street Area (April 2017)

Private Source Inflow Removal Program: A private source identification program, using Town-owned CCTV equipment, is ongoing.

I/I Rehabilitation Projects in Design or Construction:

Alden Road Pump Station Wet Well Replacement (MWRA Project No. WRA-P9-23-3-985): Design completed June 2018. Project bid August 2018. Construction anticipated to be complete in Winter 2018-19. Work is estimated to eliminate 3206 gpd of peak infiltration.

2017 I/I Removal Contract - Various Areas (General Dynamics): Sewer rehabilitation work is complete. Project work eliminated an estimated 85,032 gpd of peak infiltration.

The Infiltration Rehabilitation (Subareas 16 / Lower 22 and Others) Project (MWRA Project No. WRA-P7-23-3-751 / Needham Contract No. FY 12-14-01) included design and construction of sanitary sewer infiltration reduction measures. Project work is complete. An estimated 0.04 mgd of peak infiltration was removed from the collection system.

Reporting Period Activity: Reservoir A Pump Station replacement is complete.

Four sewer manholes were replaced (12,600 gpd of infiltration removed); CIPP lining occurred at four locations (21,150 gpd of infiltration removed); CIPP point repair occurred at ten locations (13,140 gpd of infiltration removed); CIPP lateral lining undertaken at five locations (10,800 gpd of infiltration removed); Replacing service wyes was performed at fifteen locations (26,240 gpd of infiltration removed); Sealing laterals was performed at seven locations (7200 gpd of infiltration removed).

Twelve meters (ten permanent and two portable area velocity flow module) have been installed for continued I/I monitoring. Town-wide TV inspection of 178,000 LF of sewer main was completed as part of the Phase II I/I Investigation Report (over 680,000 gpd of peak infiltration observed).

MWRA I/I Local Financial Assistance Program: The community has financed ten (10) I/I reduction projects through the Authority's funding assistance program. Of the $9,977,600 allotted through the Program's Phases 1 - 13, the community has $6,759,000 remaining in funding assistance.

24. NEWTON: North and South Systems

Background Information:

- Miles of Sewer: 271
- Sewered Population: 87,003
- Three Year (CY15 - CY17) Annual Average I/I: 6.47 mgd
- MassDEP Administrative Actions: ACO-NE-00-1001 (Terminated 6/2/17)
  ACOP-NE-96-1005 (March 1997)

Latest I/I or SSES Reports:

Commonwealth Ave Sewer/Underdrain Investigation Final Report (May 2011)
Newton Commonwealth Golf Course Sewer & Drain Evaluation Report (November 2012)
CIP – Project 1 Inspection & Assessment Final Report (November 2012)
CIP – Project 1, 2 & 3 Smoke Testing Final Report (November 2012)
CIP – Project 2 Inspection & Assessment Final Report (January 2014)
CIP – Project 4, 5, 6 & 7 Smoke Testing Report (February 2014)
Smoke Testing in Subareas B016, B022 & B029 Final Report (February 2014)
CIP – Project 3 Inspection & Assessment Report (January 6, 2015)
CIP – Project 4 Inspection & Assessment Report (February 19, 2015)
CIP – Project 5 Inspection and Assessment Report (November 2015)
Smoke Testing in Subareas B066 & B071 (March 2016)
CIP - Project 1 Post Construction Flow Evaluation (April 2016)
CIP – Project 6 Inspection and Assessment Report (June 2017)
CIP – Project 7 Inspection and Assessment Report (April 2018)
CIP – Project 8 Inspection and Assessment (Ongoing)
CIP - Project 3 and 4 Flow Evaluation (Ongoing)

Private Source Inflow Removal Program: Private Inflow Source Removal for FY18 included two (2) driveway catch basins that were disconnected from the sewer system.

I/I Rehabilitation Projects in Design or Construction:

CIP Project 2 Rehabilitations is complete. CIP Project 2 Flow Evaluation is complete and identified an estimated 416,267 gpd of peak infiltration removed.

CIP Project 3 and 4 Rehabilitations (Invitation for Bid #16-14)" is substantially complete. Warranty retest inspection is also complete. CIP Project 3 and 4 Flow Evaluation is ongoing.

CIP Project 5 Rehabilitations (Invitation for Bid #17-73)" was substantially complete June 2018. Warranty retest inspection is scheduled for Spring 2019.

Completed CIP Project 7 Inspection and Assessment, which included cleaning and inspection of 152,013 LF of sewer and inspection of 967 sewer manholes.

Completed design of CIP Project 6 Rehabilitations. The project will be bid Summer 2018. The estimated I/I removal is 299,399 gpd of Peak Infiltration, 64,224 gpd of Peak Rain-induced Infiltration and 501,408 gpd of Peak Inflow.

Started CIP Project 8 Inspection and Assessment, which includes 127,160 LF of sewer and 872 sewer manholes.

MWRA I/I Local Financial Assistance Program: The community has financed twenty-seven (27) I/I reduction projects through the Authority's funding assistance program. Of the $34,937,400 allotted through the Program's Phases 1 - 13, the community has $13,740,000 remaining in funding assistance.

25. NORWOOD: South System

Background Information:
- Miles of Sewer: 83
- Sewered Population: 28,795
- Three Year (CY15 - CY17) Annual Average I/I: 2.67 mgd
- MassDEP Administrative Actions: AO Docket No. 534 (July 1983)

Latest I/I or SSES Report: Hawes Brook Sewer Evaluation (July 2009)
Washington Street Sewer Evaluation (September 2009)

Private Source Inflow Removal Program: As part of the Meadowbrook Area Sewer Inspection, ten buildings were inspected for illicit connections. Eleven illegal connections removed to date. Within the Hawes Brook sewer tributary area, eight property owners have been notified to redirect sump pumps.

I/I Rehabilitation Projects in Design or Construction:

Meadowbrook Priority Area 5 Rehabilitation Design (MWRA Project No. WRA-P9-25-3-964) is substantially complete.

Meadowbrook Priority Area 5 Rehabilitation Construction (MWRA Project No. WRA-P9-25-3-974) to be bid Fall 2018. Rehabilitation work includes CIPP lining of 9500 LF of sewer main, lining 38 sewer manholes and lining 160 house service connections.

Area 3 and Area 4 Sewer Rehabilitation Project is substantially complete. Rehabilitation work includes CIPP lining 8245 LF of sewer main, CIPP lining of 217 service connections, manhole rehabilitation and installation of 605 LF of 8-inch PVC sewer main.

Underdrain Manhole Rehabilitation Project (MWRA Project No. WRA-P9-25-3-917) is complete. Hawes Brook-Westover Parkway Area Sewer Rehabilitation Construction is complete.

Meadowbrook Area Sewer Rehabilitation Project is complete. Rehabilitation work included CIPP lining 8190 LF of sewer main, manhole rehabilitation and the CIPP lining of 299 service connections.

Hospital and Florence Avenue Areas Sewer Rehabilitation (SRF Project) is complete. Project work included CIPP lining 7500 LF of 6 to 12-inch sewer main, manhole rehabilitation and CIPP lining 100 house service connections.

Reporting Period Activity: I/I Assessment and GIS Tracking Program (MWRA Project No. WRA-P9-25-1-919) work is ongoing.

MWRA I/I Local Financial Assistance Program: The community has financed twenty-one (21) I/I reduction projects through the Authority's funding assistance program. Of the $11,589,400 allotted through the Program's Phases 1 - 13, the community has $4,710,000 remaining in funding assistance.

26. QUINCY: South System

Background Information:
- Miles of Sewer: 230
- Sewered Population: 93,494
- Three Year (CY15 - CY17) Annual Average I/I: 4.17 mgd
- MassDEP Administrative Actions: AO Docket No. 644 (October 1986)

Latest I/I or SSES Report: Coastal Structures I/I Evaluation / Identification Study (Ongoing)
Sea Street CCTV Assessment (January 2016)
NW Quincy Sewer Interceptor TV Inspection (February 2016)
SSES & I/I Identification Plan (July 2016)
Sewer System Evaluation Survey Phase III (March 2018)
Wollaston Beach Sewer System Evaluation Phase 1 (March 2018)

Private Source Inflow Removal Program: The City has partnered with the Plumbing Inspector on its FOG Program. As part of this program, the inspector visits CV License Holders for Grease Trap Inspections. While inspecting for grease traps, the inspector also observes the property for illegal inflow connections. Although this program directly addresses FOG discharges, it has been successful in identifying direct private inflow sources for removal.

The City's Storm Water Discharge Ordinance has been approved. The ordinance forbids non-sanitary connections. A new fee structure was made effective July 1, 2013 and outlines penalties for illegal connections/discharges to the sanitary sewer system (http://www.quincyma.gov/government/pwd/watersewerfees.cfm). The fee structure mentioned remains in effect and has resulted in improvements to the system.

Developers contribute one percent of total project value to the Sewer Rehabilitation Fund. Additionally, the City has begun to implement 310 CMR 12.04 and require those new connections whose flow exceeds 15,000 GPD to continue to the 4:1 removal required under the regulations. This regulation is enforced during the site plan review process.

The City owns a CCTV sewer inspection vehicle. The vehicle provided significant input towards the development of the Coastal Structures I/I Evaluation / Identification Study. Also, many of the open cut and rehabilitation repairs on the Phase IIB Coastal Structures I/I Reduction Project were identified via the City's CCTV vehicle during I/I investigative efforts in the Houghs Neck area.

I/I Rehabilitation Projects in Design or Construction: It is anticipated that the City will be completing a significant amount of I/I reduction work over the coming years based upon the results of the July 2009 Coastal Structures I/I Evaluation / Identification Study.

Coastal manhole inspections were completed Summer 2009 with rehabilitation design completed Winter 2010. The Coastal Manhole Rehabilitation Construction Contract I was completed during Summer 2011. Work included the rehabilitation of 139 manholes and is estimated to have removed approximately 0.50 mgd of I/I. This work was partially funded through the MWRA I/I Local Financial Assistance Program.

Additional manhole inspections and sewer CCTV inspections were conducted during 2010/2011. Recommendations from this work resulted in the Phase IIA Coastal Structures I/I Reduction Project (MWRA Project No. WRA-P7-26-3-737). This project was bid in August 2011. Rehabilitation construction is complete. Warranty retesting work was performed in Summer 2013. Phase IIA work is estimated to have removed 0.85 mgd of peak I/I.

The Phase IIB Coastal Structures I/I Reduction Project (MWRA Project No. WRA-P9-26-3-903) was bid in June 2015. Construction commenced in Spring 2016 and was completed Fall 2016. Work under this phase included cleaning & TV inspection of 13,710 LF of sewer main and 103 service laterals and CIPP lining of 6870 LF of sewer main and 66 service laterals in the Houghs Neck / Sea Street / Black's Creek / Furnace Brook Parkway areas. Phase IIB work is estimated to have removed 0.65 mgd of peak I/I. The project also included the cleaning, CCTV inspection and condition assessment of 4600 LF of sewer main within areas of suspected high groundwater or coastal impact (Black's Creek and St. Moritz Pond).

Reporting Period Activity:

The Sanitary Sewer Evaluation Survey (SSES) Phase III Project is substantially complete (MWRA Project No. WRA-P9-26-13-944). Project work included: (1) Smoke Testing 48,000 LF of sewer to identify segments of pipe with direct/indirect inflow sources. Smoke Testing was conducted during periods of low groundwater and after sufficient time has elapsed from previous rainfall events; (2) Flow isolating 68,500 LF of sewer to quantify infiltration amounts within manhole-to-manhole segments of sewer. The inspection was conducted between the hours of 12AM and 6AM when groundwater levels are typically at their highest and sanitary flows are at a minimum; (3) Cleaning, TV inspecting, videotaping and recording 76,000 LF of sewer. The TV inspection was performed to locate problem areas and I/I sources within manhole-to-manhole segments of sewer; (4) Conducting topside physical survey of 576 sewer manholes for defects and I/I sources. A written log was furnished for each manhole inspected; and (5) Preparing a SSES Summary Report that details areas in which the above work was performed, summarizing work completed to date and including recommendations, a cost-effectiveness analysis and prioritization analysis for rehabilitation of pipeline/manhole defects and I/I sources identified during this investigation. Estimated rehabilitation costs was also provided. Also, a City-wide sewer system hydraulic model for critical lateral and interceptor sewers was developed. Of the 68,500 LF of sewer pipe flow isolated, approximately 6300 LF had infiltration rates higher than 4000 gpd/idm. Of the 76,600 LF of sewer pipe CCTV inspected, approximately 48,900 LF was recommended to be structurally lined and approximately 8300 LF was recommended to be replaced by open cut excavation.

Cross-Country Sewer Easement CCTV Inspections included light and heavy cleaning as required to CCTV inspect 311 LF of 6-inch sewer, 744 LF of 8-inch sewer, 991 LF of 10-inch sewer, 2025 LF of 18-inch sewer, 1799 LF of 24-inch sewer and 639 LF of 30" x 45" sanitary sewer traversing through critical cross-country portions of the sewer system.

Turner Street Utility Replacement Project included the replacement of the following: 448 LF of 8-inch DI water main, two gate valves, one hydrant with 6-inch hydrant valve, 448 LF of 8-inch PVC gravity sewer, two precast concrete sanitary sewer manholes, 100 LF of HDPE storm sewer and one defective sewer service lateral. Project work is substantially complete.

The Wollaston Beach Area SSES Phase 1 (MWRA Project No. WRA-P9-26-3-954) revealed 186,000 gpd of I/I contributing to the sewer system. Phase 1 rehabilitation design (MWRA Project No. WRA-P9-26-3-954) is complete with bidding performed in May 2017. Wollaston Beach Area SSES Rehabilitation Phase 1 (MWRA Project No. WRA-P9-26-3-962 / Quincy Contract No. 17-329) is substantially complete. Sewer rehabilitation work included 4800 LF of cleaning, inspection, testing and sealing of joints; open cut point repair within 80 LF of sewer main; CIP lining 20,000 LF of sewer main; installing CIP structural short liners in 60 LF of sewer main; cutting one (1) protruding service connection; grouting 35 service connections at the sewer main; and rehabilitating (via interior sealing and exterior grouting) 175 manholes.

Bayside Road Sewer Rehabilitation (MWRA Project No. WRA-P9-26-3-954): This area of sewer is highly susceptible to tidal I/I (Bayside Beach area). During initial CCTV, no infiltration was observed, however, staining along the sewer mains was observed indicating some evidence of infiltration. Rehabilitation involved lining approximately 3048 LF of 8 and 12-inch sewer main and 11 manholes.

John Street Lateral Repair (MWRA Project No. WRA-P9-26-3-954): Review of CCTV tapes along the John Street sewer main revealed multiple deficiencies in the service lateral connections. John Street is located adjacent to the Neponset River in an area of high groundwater. The sewer main is very shallow with little slope. Nine (9) service laterals were replaced via open cut. Project work was completed Summer 2017.

Large Diameter Sewer Survey (MWRA Project No. WRA-P9-26-3-954): This project included the heavy cleaning and CCTV inspection of 14,500 LF of 10, 15, 24 x 36 and 30 x 45-inch sewer interceptors. During this project, the City experienced a sewer emergency on an interceptor in Quincy Center. With approval from the MWRA, funds from this project were expended to remedy that sewer main emergency in the Granite Street area. This emergency cleaning and CCTV work helped locate a direct source of inflow from the drainage system into the sewer system through a 12-inch main. The City undertook temporary repairs to eliminate the condition. Permanent repairs will be conducted as part of the Wollaston Beach Area SSES Rehabilitation Phase II Project (MWRA Project No. WRA-P9-26-3-971).

Wollaston Beach Area SSES Rehabilitation Phase II Project (MWRA Project No. WRA-P9-26-3-971): Project bid in June 2018. Sewer rehabilitation work includes approximately: 2670 LF of cleaning, inspection, testing and sealing of joints; heavy cleaning and inspecting 514 LF of sewer; exterior sealing and cementitious lining of 1526 VF of sewer manholes; chemical root treatment of 9411 LF of sewer; installing 16 LF of short liner; installing CIP pipe from manhole-to-manhole in 21,129 LF of sewer; television inspecting, testing and sealing 57 service connections and cutting three (3) protruding service connections.

Avalon Beach & Bay Pointe Marina Easement Sewer Rehabilitation Project (MWRA Project No. WRA-P9-26-3-971): Sewer rehabilitation work included replacing 260 LF of 15-inch pipe; installing 750 LF of 20-inch CIP pipe and rehabilitating six (6) sewer manholes.

Emergency Sewer Repairs included: (1) Poplar Road: spot repair of a collapsed pipe; and (2) Ross Way, as part of the Quincy Center Downtown Development, included the replacement of 775 LF of 12 to 18-inch sewer pipe from Clivden Street to Granite Street. Additionally, 300 LF of 18-inch sewer was replaced in the Hancock Lot Easement.

MWRA I/I Local Financial Assistance Program: The community has financed fourteen (14) I/I reduction projects through the Authority's funding assistance program. Of the $32,780,000 allotted through the Program's Phases 1 - 13, the community has $13,124,000 remaining in funding assistance.

27. RANDOLPH: South System

Background Information:

- Miles of Sewer: 101
- Sewered Population: 33,423
- Three Year (CY15 - CY17) Annual Average I/I: 1.46 mgd
- MassDEP Administrative Actions: AO Docket No. 548 (July 1985)

Latest I/I or SSES Report: Amelian Road SSES (January 2003)
Internal TV Inspection Report (August 2010)
I/I Investigation - March 2010 Storm Events (July 2013)
Wastewater System Metering Program (June 2017)

Private Source Inflow Removal Program: The Town developed a sump pump inspection and amnesty program. As a result of the program, the Town was contacted by 202 homeowners having sump pumps. Internal inspections were completed to determine sump pump locations. One hundred twenty-one homes (121) were determined to have sump pumps connected to the sewer system. Ninety-four (94) of these homes have drainage directly adjacent to the homes. Each of the 94 homes was inspected. Design was completed to redirect these sump pumps to the drainage system. Sump pump redirection construction is complete (Randolph Contract Nos. 08-SP1/2/3 / MWRA Project No. WRA-P6-27-3-655). Total peak flow inflow removed is estimated to be 0.61 mgd.

I/I Rehabilitation Projects in Design or Construction: An I/I Investigation Report (July 2013) was drafted for the community areas affected by the March 2010 storm events. As a result of that report, a rehabilitation contract (Randolph Contract 15-S1 / MWRA Project No. WRA-P8-27-3-820) was designed (March 2015) and bid (April 2015). Rehabilitation construction is complete and included lining of the Vine Street Pump Station wet well, CIPP lining 1600 LF of sewer main,

installing seven short liners, grouting of 24 service connections, installing nine manhole liners, digging and replacing two sewer mains, testing and sealing of 5500 LF of sewer main and root removal within 500 LF of sewer main.

Reporting Period Activity: A Town-wide wastewater flow metering program was performed during Spring 2017. Data review/report preparation scheduled for completion Summer 2018. The Town is finalizing a SSES based on the Spring 2017 wastewater flow metering.

The Pond Street Pump Station Rehabilitation was completed in October 2017. The Michelle Lane Pump Station was upgraded to increase capacity to allow for the expansion of the Avalon Bay development.

MWRA I/I Local Financial Assistance Program: The community has financed ten (10) I/I reduction projects through the Authority's funding assistance program. Of the $10,070,800 allotted through the Program's Phases 1 - 13, the community has $6,176,000 remaining in funding assistance.

28. READING: North System

Background Information:

- Miles of Sewer: 96
- Sewered Population: 24,719
- Three Year (CY15 - CY17) Annual Average I/I: 1.28 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: Infiltration/Inflow Investigations – Spot Gauging & Flow Isolation Final Report (August 2010)
Infiltration and Inflow (I/I) Investigations Final Report (November 2012)
I/I Investigations Report – Section 2 Supplement (November 2014)

Private Source Inflow Removal Program: No additional sump pumps were removed during this period. The Town is continuing to work with property owners where illicit connections were found during the Building Inspection Program. The Town will be working to set up a program over the next year to utilize some of the collected funds.

I/I Rehabilitation Projects in Design or Construction: During the past year, the following sewer rehabilitations were performed:

Collection System Improvements Contract 17-14

- Clean & TV Inspection approximately 6700 LF of sewer
- Manhole Brick Corbel repaired and/or replaced for 81 manholes
- Cementitious Manhole Lining of 390 VF of manholes
- Invert & Bench Repairs at 9 manholes
- Installed Cured-in-Place-Pipe Lining on various sewer mains (approximately 5280 LF)

Collection System Improvements Contract 18-06

- Clean & TV Inspection approximately 4700 LF of sewer
- Installed Cured-in-Place-Pipe Lining on various sewer mains (approximately 13,200 LF)

Reporting Period Activity: The Town installed approximately 990 LF of sewer service laterals to 22 residences. In addition, the Town received $153,080 in sewer I/I connection fees from various developments in FY18.

In August 2017, $844,000 in grant/loan funds were distributed by MWRA for the CIPP Construction Project. Details of this project are included in Attachment 4 (MWRA Project No. WRA-P9-28-3-970).

MWRA I/I Local Financial Assistance Program: The community has financed eight (8) I/I reduction projects through the Authority's funding assistance program. Of the $7,749,100 allotted through the Program's Phases 1 - 13, the community has $3,120,000 remaining in funding assistance.

29. REVERE: North System

Background Information:

- Miles of Sewer: 98
- Sewered Population: 53,702
- Three Year (CY15 - CY17) Annual Average I/I: 2.48 mgd
- MassDEP Administrative Actions: No. 837 (April 1991)
- EPA Clean Water Act Administrative Order: CD 1:10-cv-11460 (November 16, 2010)

Latest I/I or SSES Reports:

Sewer System Evaluation Survey (SSES) Phase I Study Areas – CWSRF No. 3233 Final Report (July 2010)
Internal CCTV Inspection of Revere Trunk Sewer Technical Memorandum Report (October 2011)
Sewer System Evaluation Survey (SSES) – Phase II (CWSRF 3411) Final Report (July 2011)
Sewer System Evaluation Survey (SSES) – Phase III (CWSRF 3513) Final Report (July 2012)
Comprehensive Stormwater and Wastewater Management Plan (CWSRF 3513) Final Report (December 2013)
Sewer System Evaluation Survey (SSES) – Phase IV (CWSRF 3655) Final Report (December 2013)
SSES Phase V and Supplemental Field Investigations (CWSRF 3831) (December 31, 2014)
CMOM Program Development (CWSRF 3817) (March 2015)
SSES – Phase VI and IDDE Planning Investigations (CWSRF 3908) (December 31, 2015)
SSES – Phase VII Field Investigations (CWSRF 3956) (December 31, 2016)
Illicit Connection Detection (CWSRF 3957) (December 31, 2016)
SSES – Phase VIII Field Investigations (CWSRF 4054) (December 31, 2017)
Illicit Connection Detection (CWSRF 4055) (December 31, 2017)
SSES – Phase IX Field Investigations (CWSRF 4183) (December 31, 2018)
Illicit Connection Detection (CWSRF 4176) (December 31, 2018)

Private Source Inflow Removal Program: During FY18, Revere performed the following work:

During Contract 2 (CWSRF-3910) the City performed the following work:
A total of 18 Properties were completed under Contract 2.

- 14 Properties were set up as a splash set up.
- 1 Properties was set up as connection to drain pipe.
- 3 Properties were set up as connection to catch basin/drain manhole.

During Contract 3B (CWSRF-4052) the City performed the following work:
A total of 39 Properties were completed under Contract 3B.

- 21 Properties were completed as a splash set up.
- 10 Properties were set up as connection to drain Pipe.
- 7 Properties were set up as connection to catch basin/drain manhole.
- 1 Property was set up as a Leaching Basin.
- Note that under Contract 3B was the Oliver Terrace Drain Extension. An additional four (4) properties at Oliver Terrace were added to this contract, which are already inclusive in the total number (39 properties) completed.
- A total of 136 LF of 12-inch ductile drain was put in at Oliver Terrace connecting to (2) 4-inch DI Diameter DMH and (2) 4-inch Diameter Catch Basin.

The City Awarded Contract 3A (CWSRF-4052, WW-001) in September 2017 to Moriarty & Sons, Inc.
A total of 44 Properties were completed under Contract 3A.

- 22 Properties were set up as a splash set up.
- 13 Properties were set up as connection to drain Pipe.
- 9 Properties were set up as connection to Catch Basin/Drain Manhole.
- Note that under Contract 3A was the Fowler Avenue Drain Pipe Extension (SRF Eligible Fund).
- A total of 523 LF of 12” Ductile Drain Pipe was extended.
- A total of (3) 4” DMH was put in at Fowler Avenue.
- A total of 1 Catch Basin connection at Fowler Avenue.

- Under the Non- SRF Eligible fund, a total of 963 LF of 8-inch PVC Water Main Pipe was replaced at Fowler Avenue.
- A total of 28 Properties were connected to the new/replacement 8-inch Water Main Pipe at Fowler Avenue.

The City Awarded Contract 3C (CWSRF-4052, WW-003) in April of 2018 to Moriarty & Sons, Inc.
A total of 9 Properties were completed under Contract 3C.

- 1 Property was completed as a splash set up.
- 7 Properties completed as a connection to Catch Basin/DMH.
- 1 Property completed as a connection to drain pipe.

The City continues to maintain a (10:1) I/I removal ratio for new commercial and multi-family construction.

I/I Rehabilitation Projects in Design or Construction: The following sewer rehabilitations were completed during the current period:

- Cured-in-place lining of 250 LF of 6-inch sewer
- Cured-in-place lining of 24,987 LF of 8-inch sewer
- Cured-in-place lining of 2,250 LF of 10-inch sewer
- Curd-in-place lining of 339 LF of 12-inch sewer
- Cured-in-place lining of 1020 LF of 15-inch sewer
- Cured-in-place lining of 1625 LF of 24-inch sewer
- Performed 14 dig-in-place spot repair
- Installed 1 short liner in a 24-inch sewer
- Installed lateral service connection lining at 474 locations
- Installed full length later service lining at 23 locations
- Grouted 50 lateral service connections
- Installed 6 new sewer manholes
- Replaced 21 sewer service connections
- Replaced 33 brick corbels with HDPE grade rings
- Installed 336 vertical inches of HDPE grade rings in manholes
- Installed 1326 VF of cement/epoxy manhole lining
- Epoxy lined 250 sf of sewer vaults
- Sealed 125 manhole corbels
- Constructed 1 new manhole invert
- Cleaned and CCTV 20,498 LF of main line pipe

Reporting Period Activity: Besides the previously mentioned work, the rehabilitation of the sanitary sewer pump station at Sherman Street was completed.

MWRA I/I Local Financial Assistance Program: The community has financed six (6) I/I reduction projects through the Authority's funding assistance program. Of the $16,940,900 allotted through the Program's Phases 1 - 13, the community has $11,438,000 remaining in funding assistance.

30. SOMERVILLE: North System

Background Information:

- Miles of Sewer: 128
- Sewered Population: 78,804
- Three Year (CY15 - CY17) Annual Average I/I: 4.47 mgd
- MassDEP Administrative Actions: Unilateral Order (September 2010)
  NON-NE-00-1006 (January 2000)

Somerville is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Somerville are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Report: City-Wide Sewer Assessment Report (February 2009)
Sewer and Combined Sewer CIP (September 2016)
CIP Project 1 – Manhole Inspection, Assessment and Design (March 2018)
CIP Project 2 – Pipeline Inspection, Assessment, and Design (Ongoing)

Private Source Inflow Removal Program: The City is enforcing City Ordinance Chapter 11 (Public Works), Article VII (Sewers), Section 11-165 (roof water, surface water and other drainage). This ordinance gives the City authority to disconnect and prevent roof, surface and other water from entering the collection system in various sections of the City.

I/I Rehabilitation Projects in Design or Construction:

Cedar Street Sewer Separation Project:

The Cedar Street Sewer Separation Project began in June 2016 and construction is ongoing. P. Gioioso & Sons completed the subsurface component of the project in May 2018 including localized sewer separation from Elm Street to Highland Avenue by replacing existing brick combined sewer with 48-inch RCP drain and 12-inch PVC sewer. Gioioso is currently completing the surface restoration component of the project. The system currently re-combines in Elm Street, therefore there is no inflow reduction until future separation work is completed. CCTV inspection to quantify infiltration reduction was not performed; however, given the age of the system, a benefit can be assumed.

Bike Path Sewer / Drain Repair:

The rehabilitation of a 24-inch cross-country combined sewer pipe has been put on hold due to the private property impacts and restoration costs. The Engineering Department is currently evaluating options to reroute the line to within City rights-of-way.

Somerville Avenue Infrastructure and Streetscape Improvement Project:

Barletta Heavy Division began construction of the three-year project in May 2018. To date, work has consisted of utility relocations in advance of the installation of the large stormwater box culvert, and cleaning of existing sewers in advance of lining.

15 Year CIP:

The field work associated with the CIP Project 1 manhole Inspection & Assessment Project began in February 2017 and was completed on June 30, 2017. Weston & Sampson inspected 4478 manholes, and identified 255,024 gpd of infiltration. Design of rehabilitation for those manholes has been completed and bid packages for remediation are currently being prepared.

The field work associated with the CIP Project 2 pipeline Inspection & Assessment Project in the areas of Teele Square, Davis Square and Tufts began in April 2018 and is ongoing.

Reporting Period Activity: In May 2018, the City formally adopted an Inflow/Infiltration ordinance requiring 4:1 offset of any new or increased flows to the system. The ordinance is more stringent than state guidance and requires the mitigation for any and all increases, although an administrative de minimus exemption is available to internal remodel projects that result in increases less than 330 gpd. To facilitate the program, developers may pay a fee that is deposited to a dedicated I/I reduction fund created under the Sewer Enterprise.

MWRA I/I Local Financial Assistance Program: The community has financed nine (9) I/I reduction projects through the Authority's funding assistance program. Of the $25,955,800 allotted through the Program's Phases 1 - 13, the community has $15,838,000 remaining in funding assistance.

31. STONEHAM: North System

Background Information:
- Miles of Sewer: 63
- Sewered Population: 21,401
- Three Year (CY15 - CY17) Annual Average I/I: 1.11 mgd
- MassDEP Administrative Actions: None
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-028 (August 2009)

Latest I/I or SSES Report: Manhole / CCTV Inspection in Marble / Main Streets Area Final Report (September 2007)
Infiltration/Inflow Analysis Summary Report (December 2017)

Private Source Inflow Removal Program: The Town is continuing to investigate and eliminate illicit cross-connections between the sanitary sewer and storm water systems as part of the Illicit Discharge Detection and Elimination Program (IDDE).

The Town has also established a sewer connection fee. The Town is evaluating options for establishing a 4:1 I/I removal program in accordance with recently enacted MA DEP Regulations at 314 CMR 12.

I/I Rehabilitation Projects in Design or Construction: The Town has two significant ongoing projects:

- Phase 6 - Boston Regional Medical Center (BRMC) Sewer Rehabilitation. The project was designed and inspected by Arcadis, construction is in progress by J.P. Cardillo & Sons. The project includes installation or rehabilitation of SMH's, open cut repairs or pipe redesign, CIPPL & CIPSR. Completion date September 2018. The project area includes BRMC, Norval Ave, Washington St, Pomeworth St, Fellsway East & Ravine Road.

- Fallon Road / Park Street System Rehabilitation. The project was designed and inspected by Stantec. The project is in its third rehabilitation phase with work on sewer segment located from Hillside Road to Maple Street. The project is 10-15 percent complete and the contractor performing the project is Ribeiro Construction.

Reporting Period Activity: The Town is continuing to investigate and eliminate illicit cross-connections between the sanitary sewer and storm water systems as part of the Illicit Discharge Detection and Elimination Program (IDDE). Three (3) sewer manholes on a dead end street were discovered to still be part of a combined system (sewer & storm drain). This situation is scheduled to be corrected in October 2017.

Additional Developments for FY18 include the following:
- Fallon Road Apartment Complex (350 units) are completed with 90% occupied.
- BRMC:
  - Sterling Hills Condos (180 units) are 90% completed with occupancy in Sept/October.
  - Langwood Commons Apt. (225 units) has broken ground & expected completion date of Spring 2020.
  - Medical Condo/Rental (No. of Units: TBD) project is in design stage.
- Coventry Way Development has been completed with occupancy by October 2018.
- Adams Road Development is partially completed (30%). Total completion should be Fall 2019.
- High Street Development (3 homes) has started with completion/occupancy by December 2018.
- 380 Main Street Condo Complex of commercial & residential properties (50 units) is complete.

MWRA I/I Local Financial Assistance Program: The community has financed ten (10) I/I reduction projects through the Authority's funding assistance program. Of the $7,829,900 allotted through the Program's Phases 1 - 13, the community has $2,910,000 remaining in funding assistance.

32. STOUGHTON: South System

Background Information:
- Miles of Sewer: 89
- Sewered Population: 19,112
- Three Year (CY15 - CY17) Annual Average I/I: 1.36 mgd
- MassDEP Administrative Actions: AO Docket No. 538 (June 1984)

Latest I/I or SSES Report: Year 8 Rehabilitation Evaluation (May 2013)
Years 9 & 10 Rehabilitation Evaluation (February 2014)
Years 1 & 2 (Round 2) Sewer System I/I Investigation (November 2015)
Years 3 & 4 (Round 2) Evaluation (July 2016)
Reprioritized Year 5 Spring 2017 I/I Investigation (September 2017)
Reprioritized Year 6 Spring 2018 I/I Investigation (Ongoing)

Private Source Inflow Removal Program: The Town has adopted new sewer use regulations which address private inflow removal. TV inspection of service connections / house-to-house inspections is ongoing.

I/I Rehabilitation Projects in Design or Construction:

Years 1 & 2 Infiltration Rehabilitation Construction (Stoughton Contract 16-1 / MWRA Project No. WRA-P9-32-3-935) is complete with Warranty Retesting work completed July 2018.

Years 3, 4 and 5 Construction Design (Stoughton Contract 18-1 / MWRA Project No. WRA-P9-32-3-982) complete March 2018. Construction to begin in August 2018. Project to remove an estimated 0.075 mgd of peak infiltration and 0.079 mgd of peak inflow.

Reporting Period Activity:

Reprioritized Year 5 Spring 2017 I/I Investigation (MWRA Project No. WRA-P9-32-1-963) completed Spring 2017. Data review/report preparation completed September 2017. Investigation identified 0.039 mgd of peak removable infiltration and 0.006 mgd of peak removable inflow.

Reprioritized Year 6 Spring 2018 I/I Investigation (MWRA Project No. WRA-P9-32-3-982) completed Spring 2018. Data review/report preparation scheduled for completion Fall 2018.

Sewer extension of approximately 3000 LF at Forest Green by private developer is ongoing. Sewer extension of approximately 9000 LF off Daly Drive by private developer is ongoing.

MWRA I/I Local Financial Assistance Program: The community has financed thirteen (13) I/I reduction projects through the Authority's funding assistance program. Of the $7,902,900 allotted through the Program's Phases 1 - 13, the community has $3,180,000 remaining in funding assistance.

33. WAKEFIELD: North System

Background Information:
- Miles of Sewer: 93
- Sewered Population: 26,007
- Three Year (CY15 - CY17) Annual Average I/I: 2.26 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report:
Sanitary Sewer Investigation Assistance – Subarea 3 Smoke Testing, Dye Testing & Dye Flooding Program Final Report (November 2011)
Sanitary Sewer Investigation Assistance – Municipal Building Inspections Final Report (November 2011)
Sanitary Sewer Investigation Assistance – Subarea 3 Television Inspection of Sewers and Manhole Investigations in Subarea 3 & Subarea 6 Low-lying Areas Final Report (April 2012)

2013 Infiltration & inflow Investigation – Gauging Areas 6 & 7 Final Report (January 2014)
2014 Smoke Testing Program – Gauging Areas 6 & 7 of Subarea 6 (January 2015)
2015 Smoke Testing Program – Sewer Subarea 2 (June 2016)
TV Inspection & Cleaning of areas to be paved (August 2016)
Sewer System Evaluation Survey – Year 1 (February 2017)
Sewer System Evaluation Survey – Year Two (December 2017)
Sewer System Evaluation Survey – Year Three (Ongoing)

Private Source Inflow Removal Program: The Town is developing a plan to notify residents in the Paon Boulevard area of a potential pilot building inspection program as this area is being investigated for potential inflow sources.

I/I Rehabilitation Projects in Design or Construction: The Final Report for television inspection and manhole inspections that were performed in approximately 46,000 LF of sewer main where paving will be performed in 2018 (Sewer System Evaluation Survey – Year Two) was completed in December 2017.

Television inspection and manhole inspections for approximately 50,000 LF for the Sewer System Evaluation Survey – Year Three is currently ongoing. This project goal is to identify I/I and structural defects in select areas that are scheduled to be paved within the next calendar year.

Repaired sewer main on Brook Street and Valley Street eliminated approximately 8000 gpd of I/I.

Reporting Period Activity: See projects noted above. The Town continues to require a 4 to 1 removal of flow from completed subdivisions/ developments.

MWRA I/I Local Financial Assistance Program: The community has financed twenty-five (25) I/I reduction projects through the Authority's funding assistance program. Of the $9,806,900 allotted through the Program's Phases 1 - 13, the community has $3,840,000 remaining in funding assistance.

34. WALPOLE: South System

Background Information:
- Miles of Sewer: 59
- Sewered Population: 17,993
- Three Year (CY15 - CY17) Annual Average I/I: 0.64 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: I/I Investigation Program: Year 7 (January 2014)
I/I Investigation Program: Year 8 (February 2016)
I/I Investigation Program (Round 2): Year 1 (January 2017)
I/I Investigation Program (Round 2): Year 2 (January 2018)
I/I Investigation Program (Round 2): Year 3 (Ongoing)

Private Source Inflow Removal Program: The Town includes house-to-house private inflow inspection program as part of its water meter replacement program. For new connections greater than 15,000 gpd, a 4 to 1 reduction as per 314 CMR 12.04 is required. For new connections less than 15,000 gpd, developers are required to remove I/I at a ratio of 2.3 to 1 (developers may pay the town $13.60 per gallon should they so choose).

I/I Rehabilitation Projects in Design or Construction: Years 4-7 I/I Rehabilitation Project (Walpole Contract 2015-30 / MWRA Project No. WRA-P9-34-3-914) bid May 2015. Construction began July 2015 and was completed March 2016. It is estimated that the Years 4-7 project removed 0.08 mgd of peak infiltration from the Town's sewer system.

Reporting Period Activity: Year 3 I/I Investigation (Round 2) work completed Spring 2018. Data review/report preparation ongoing.

Year 2 I/I Investigation (Round 2) work completed Spring 2017. Data review/report preparation completed January 2018. Television inspection revealed an estimated 29,664 gpd of peak infiltration. Topside manhole inspection revealed an estimated 29,088 gpd of peak infiltration.

Year 1 I/I Investigation (Round 2) (MWRA Project No. WRA-P9-34-3-914) work completed Spring 2016. Summary Report completed January 2017. Television inspection revealed an estimated 24,624 gpd of peak infiltration. Topside manhole inspection revealed an estimated 6048 gpd of peak infiltration.

A private developer I/I mitigation project was completed in August 2017 as an obligation to the Town of Walpole. The developer removed approximately 1080 gpd of peak infiltration. A private developer I/I mitigation project was completed in May 2018 as an obligation to the Town of Walpole. The developer removed approximately 6329 gpd of peak infiltration.

A total of 1860 LF of 8-inch sewer main has been added to Walpole's system over the past year.

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the $6,110,000 allotted through the Program's Phases 1 - 13, the community has $3,068,000 remaining in funding assistance.

35. WALTHAM: North System

Background Information:

- Miles of Sewer: 138
- Sewered Population: 61,318
- Three Year (CY15 - CY17) Annual Average I/I: 2.69 mgd
- MassDEP Administrative Actions: ACOP-NE-10-1N001 (February 2010)
  ACOP-NE-04-1N004 (January 2005)
  ACOP-NE-02-1003 (May 2003)
  NON-NE-01-1066 (April 2001)

Latest I/I or SSES Report:

Updated Wastewater Facilities Plan (including Operations and Maintenance Plan) (April 2011)
Rangley Acres - I/I Removal Project Report (Spring 2012)
Polaroid Redevelopment Project Report (Summer 2013)
Inflow & Infiltration Improvements Section 5C (Lexington St - Trapelo Rd to Town Line) (March 2014)
Inflow & Infiltration Analysis Sewer System Section 12A-2 Lakeview Area (July 2014)
Inflow & Infiltration Improvements Phase 5.1, Section 6B6 - Pond End Lane Area (August 2014)
Post Flow Metering Report - Area 13/14-A SSO Mitigation Project (June 2016)
Post Flow Metering Report - Area 12-A -2-3 Lakeview (June 2016)
Post Flow Metering Report - Area 6B6 - Pond End Lane (July 2016)
Post Flow Metering Report - Alderwood Road Area (July 2016)
Area 13/14B – Sewer System Evaluation Survey (February 2018)

Private Source Inflow Removal Program: Updates for FY18 include:

- 41 Building Inspections were conducted in Areas 13/14B, five illicit sump pumps were detected and are scheduled to be removed as part of the Sewer Rehabilitation Project for this area.
- 20 Building Inspections were conducted in Area 5A, two illicit sump pumps were detected and are scheduled to be removed as part of the Sewer Rehabilitation Project for this area.
- One sump pump was removed at 43 Auburn Street for an inflow removal total of 1200 gpd.

I/I Rehabilitation Projects in Design or Construction: The City's consultant completed work on the design of sewer rehabilitations ($500,000) for the Areas 13/14-B (Bear Hill Valley / West End) SSO Mitigation Project. The Contract Documents were completed by December 2017. The City estimates the construction budget to be $4.5 million.

In addition, sewer service lateral repairs by City crews during July to December 2017 were estimated to remove 76 gpd of I/I. Additional sewer service lateral repair by City crews during January to June 2018 were estimated to remove 103 gpd of I/I. A sump pump removed at 43 Auburn Street was estimated to remove 1200 gpd of inflow.

Reporting Period Activity: In the Beaver Street Area (Area 5A), a Sewer System Evaluation Survey Study (SSES) project and subsequent design of the sewer rehabilitations was previously completed. The project has been bid and the construction contract was awarded to Aqua Line Corp. for construction in August 2017. Sewer rehabilitation work consisted of:

replacement of sewer and manholes; lining of sewer and manholes; point repairs of sewer; manhole point repairs; replacement of manhole frames & covers and all associated appurtenances. This rehabilitation work will be in area of: Azalea Road, Beaver Street, Forest Street, Ledge Road, Lyman Street, Rogers Way, Valley View Rd and Woodcliff Drive. The estimated I/I to be removed by this project is 121,000 gpd. Progress during FY18 includes:

- 500 LF of new 10-inch sewer installed;
- 3 new precast sewer manholes installed;
- 1850 LF of sewer main has been replaced;
- 20 existing brick manholes have been removed and replaced with precast structures;
- 7 leaking frame and cover sets, have been removed and replaced;
- 14 sewer services with Bermeco material have been replaced with watertight PVC pipe;
- 6 point repairs have been made using open cut excavation on defective sewer pipes;
- 3 point repairs have been made using trenchless short liners on defective sewer pipes;
- 240 LF of sewer main has been lined by CIPP;
- 400 LF of sewer main has received heavy pipe cleaning; and,
- 500 LF of sewer main has been CCTV'd, reviewed and evaluated.

MWRA I/I Local Financial Assistance Program: The community has financed eight (8) I/I investigation projects through the Authority's funding assistance program. Of the $22,282,400 allotted through the Program's Phases 1 - 13, the community has $10,905,000 remaining in funding assistance.

36. WATERTOWN: North System

Background Information:

- Miles of Sewer: 75
- Sewered Population: 32,996
- Three Year (CY15 - CY17) Annual Average I/I: 0.98 mgd
- MassDEP Administrative Actions: ACOP-NE-97-5004

Latest I/I or SSES Report: TV Inspection Report - Nichols Avenue & Boylston Street Sewers (June 2009)
TV Inspection - Lexington Street Sewer (December 2011)
TV Inspection Subsystem 7 and Sewer Rehabilitation (2016)
Additional TV Inspection Subsystem 7 and Sewer Rehabilitation (2017)
CIP 1 – Sewer Rehabilitation Subareas 1 and 9 (Ongoing)
CIP 1 – Sewer Rehabilitation Subareas 6 and 7 – Howard Street (Ongoing)
CIP 1 – Sewer Rehabilitation Subareas 2, 14, 18 and Arsenal Street (Ongoing)

Private Source Inflow Removal Program: In May, 2018, a catch basin at No. 70 School Street was disconnected from the sewer system and reconnected to the drain system.

I/I Rehabilitation Projects in Design or Construction: Design of 2017 Sewer Rehabilitations was completed in March 2018. Construction of the Sanitary Sewer Rehabilitations (Contract 18-01S) is currently ongoing. The Notice to Proceed was issued on July 9, 2018. Based on the cost-effective analyses completed as part of the 2017 Sewer Rehabilitations Report (December 2017), approximately 8568 gpd of infiltration will be removed from sanitary sewer collection system as part of Contract 18-01S.

Started CIP Project 1 – Subareas 1 and 9 Inspection and Assessment, which includes 42,050 LF of sewers and 217 manholes.

Started CIP Project 1 – Subareas 6 and 7 (Howard Street) Inspection and Assessment, which includes 28,830 LF of sewers and 133 manholes.

Started CIP Project 1 – Subareas 2, 14, 18, and Arsenal Street Inspection and Assessment, which includes 26,185 LF of sewers and 129 manholes.

Construction of Infiltration/Inflow Removal Project (Contract 17-01S / MWRA Project No. WRA-P9-36-3-923) associated with the Boylston Street / Nichols Avenue CCTV inspection Project was completed in May 2018. Project work included approximately 7200 LF of 8 to 15-inch CIP lining, two lined sewer services, 143 LF of 6-inch full length replacement, one

point repair, two service replacements and heavy cleaning and inspection of approximately 1100 LF of sewer. This project is estimated to have removed approximately 37 gpm from the sewer system.

Reporting Period Activity: Replacement of 1300 LF of 8-inch sewer, 60 LF of 6-inch sewer, 33 sewer service connections, five (5) sewer manholes, and 30 VF of sewer manhole cementitious lining on Arden Road (near Oakley Road, and Maplewood Road, between School Street and Commonwealth Road) is currently ongoing. The project started Fall 2017 and was on shutdown Winter 2017/2018.

Completed a lining and spot repair contract with Insituform Technologies in the amount of $386,500.

Coppola Realty Development, provided a $237,800 contribution to partially fund sewer investigations is Sub-Areas 6 and 7 (Part of CIP Project 1, above) as part of its 60 Howard Street and 380 Pleasant Street projects.

Greystar provided a $200,000 contribution to fund future sewer investigations and rehabilitation work as part of its Elan Union Market project.

In February 2018, $524,000 in grant/loan funds were distributed by MWRA for Watertown's I/I Investigation and Rehabilitation Program. Details of this project are included in Attachment 4. The estimated peak infiltration removal for this project is 0.20 mgd (MWRA Project No. WRA-P9-36-3-980).

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I investigation projects through the Authority's funding assistance program. Of the $10,155,800 allotted through the Program's Phases 1 - 13, the community has $5,970,000 remaining in funding assistance.

37. WELLESLEY: South System

Background Information:

- Miles of Sewer: 134
- Sewered Population: 28,334
- Three Year (CY15 - CY17) Annual Average I/I: 1.26 mgd
- MassDEP Administrative Actions: AO Docket No. 579 (May 1985)

Latest I/I or SSES Report: Phase 2 SSES (November 1994)
I/I Analysis and SSES (Ongoing)

Private Source Inflow Removal Program: Based upon previous private source inflow studies, DPW is contacting the owners of identified illegal sump pumps. To date, 18 sump pumps have been removed from the sanitary system. Also, the Town continues to pursue illegal sump pump connections identified through the water meter ERT Battery Changeout Transaction Program.

I/I Rehabilitation Projects in Design or Construction:

During CY17/18, Sewer System Inspection and Rehabilitation work consisted of 9454 LF of sewer main cleaning and TV inspection, 2055 joints tested, 476 joints sealed with grout and 439 VF of brick manholes were sealed. The Town also flushed 203,433 LF of sewer main and rodded 353 sewer laterals.

Sewer System Inspection and Rehabilitation (Contract No. 13C-460-1564 / MWRA Project No. WRA-P9-37-3-986) work consisted of chemical root treatment of 6975 LF of sewer; testing 6995 joints and sealing/retesting 2371 joints; installing 21 LF of CIP short liners; testing & sealing 13 LF of service connections and sealing 388 VF of manholes. An estimated 0.03 mgd of peak infiltration was removed from the collection system.

McLean Street Sewer Repair **(**MWRA Project No. WRA-P9-37-3-986) work consisted of the replacement of 200 LF of existing 10-inch VC pipe with 10-inch HDPE pipe via pipe bursting. Work on McLean Street was located between Willow Street and Ashmont Road. An estimated 0.01 mgd of peak infiltration was removed from the collection system.

Cliff Road Sewer Repair (MWRA Project No. WRA-P9-37-3-986) work consisted of the replacement of five (5) LF of existing 8-inch VC pipe with 8-inch PVC pipe via open cut. Work on Cliff Road was located between Pierce Road and No. 206 Cliff Road. An estimated 0.01 mgd of peak infiltration was removed from the collection system.

Worcester Street (Route 9) Sewer Repair (Contract No. 17C-460-1581 / MWRA Project No. WRA-P9-37-3-986) work consisted of a spot repair of six LF of existing 10-inch VC pipe with 10-inch PVC pipe. Work on Route 9 was located between Rockland Street and No. 504 Worcester Street. An estimated 0.01 mgd of peak infiltration was removed from the system.

Sewer System Inspection and Rehabilitation (Wellesley Contract No. 13C-460-1482) work completed in CY17. Work consisted of cleaning and TV inspection of 35,418 LF of sewer; testing 6995 joints and sealing/retesting 2371 joints; and sealing 388 VF of manholes. The Town also flushed 264,270 LF of sewer main and rodded 326 sewer laterals.

Reporting Period Activity: In FY18, the Town contracted for replacement design of the Lake Road Sewer Lift Station. Pump station replacement construction to be performed in FY19 based on the extended delivery time for the station from the manufacturer.

An SSES covering 40 wastewater meters over a 10-week period (beginning March 2018) was completed. Data review/report preparation is ongoing.

MWRA I/I Local Financial Assistance Program: The community has financed thirteen (13) I/I reduction projects through the Authority's funding assistance program. Of the $9,249,700 allotted through the Program's Phases 1 - 13, the community has $5,667,196 remaining in funding assistance.

38. WESTWOOD: South System

Background Information:

- Miles of Sewer: 77
- Sewered Population: 14,564
- Three Year (CY15 - CY17) Annual Average I/I: 0.73 mgd
- MassDEP Administrative Actions: AO Docket No. 578 (May 1985)

Latest I/I or SSES Report: SSES Phases 1 and 2 (January 1991)
Town-Wide I/I Study (June 2009)
I/I Investigation Program (Ongoing)

Private Source Inflow Removal Program: A house-to-house inspection survey has been completed. The survey included inspection of 1880 residences and identified 135 suspect sump pumps. Sump pump removal notification letters forthcoming.

I/I Rehabilitation Projects in Design or Construction:

Phase 1 - I/I Rehabilitation Design/Construction (MWRA Project No. WRA-P9-38-3-949): Design cost-effective and value-effective sewer rehabilitations; prepare construction rehabilitation drawings and specifications for public bidding; and prepare a final cost estimate for the designed rehabilitations. Construct cost-effective and value-effective sewer rehabilitations and perform construction public bid/award/resident project representative services. Sewer rehabilitation work included approximately: Cleaning and TV inspection of 20,000 LF of sewer main; installing 5020 LF of CIP pipe; performing 112 lateral connection repairs; raising 17 manhole frames & covers to grade; replacing three manhole frames & covers and rehabilitating 19 sewer manholes (via cementitious and epoxy lining). Project work was performed in the following areas: Pond Plain Road to Oak Street / Pond Street Fill-in Area / High Street to Oriole Road / Stanford Road to Sunrise Road. Phase 1 work began June 2016 and was completed Fall 2017.

Phase 2 - I/I Investigation (MWRA Project No. WRA-P9-38-3-949): Cleaning, TV inspection, videotaping and recording 15,000 LF of sewer main and performing topside manhole inspections of 75 sewer manholes. Project work performed in the following areas: School Street Area / Hartford Street Fill-in Area / Lake Shore Drive to High Street / Lake Shore Drive to Arcadia Road / Sycamore Drive to Arcadia Road. Phase 2 work began March 2017 and was completed Summer 2017.

Reporting Period Activity: Construction of large retail/residential development on University Avenue is ongoing. The project involves installation of new 6 and 8-inch PVC sewer mains throughout the development. Extension of an 8-inch PVC sewer line on Summer Street and Grove Street for approximately 1600 LF completed (will add five additional services to the sanitary system).

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the $4,302,300 allotted through the Program's Phases 1 - 13, the community has $2,211,000 remaining in funding assistance.

39. WEYMOUTH: South System

Background Information:

- Miles of Sewer: 238
- Sewered Population: 53,646
- Three Year (CY15 - CY17) Annual Average I/I: 3.88 mgd
- MassDEP Administrative Actions: ACO-NE-04-1N002 (September 2004)
  NON-NE-00-1025 (August 2000)
  AO Docket No. 543 (November 1984)

Latest I/I or SSES Report: Town-Wide Sewer Investigation - Year 3 (December 2014)
Town-Wide Sewer Investigation - Year 4 (December 2015)
Town-Wide Sewer Investigation - Year 5 (December 2016)
Town-Wide Sewer Investigation - Year 6 (January 2016)
Town-Wide Sewer Investigation - Year 7 (Ongoing)

Private Source Inflow Removal Program: The Town has completed the redirection of 330 sump pumps (for an estimated 165,000 gpd of inflow removal). Six (6) sump pumps were redirected during FY13-18.

I/I Rehabilitation Projects in Design or Construction:

The Year 5 Sewer System Infiltration Rehabilitation Design Project (MWRA Project No. WRA-P9-39-2-965) was completed in October 2017. Rehabilitation Construction (Weymouth Contract No. PW-17-003-S / MWRA Project No. WRA-P9-39-3-978) completed May 2018. Project work was performed in Subareas B-1 / B-4. Work included 2964 LF of cleaning and TV inspection; 9847 LF of cleaning, inspecting, testing and sealing; root treatment of 2986 LF of sewer main and one (1) manhole; installing 2297 LF of CIP pipe and 74 LF of CIP short liners; testing and grouting 25 service connections; cementitious lining of nine manholes (95 VF); furnishing and installing eight (8) manhole frames and covers; furnishing and installing eleven (11) manhole inflow dishes; and performing one (1) open cut point repair. Approximately 0.04 mgd of infiltration and 0.10 mgd of peak design storm inflow was removed through this project.

The Year 4 Sewer System Infiltration Rehabilitation Design Project (Weymouth Contract PW-16-001-S / MWRA Project No. WRA-P9-39-3-940) was completed in July 2016 and bid in August 2016. Rehabilitation Construction was completed in March 2017. Project work was performed in Subareas C-3 / D-1-1. Work included cleaning/inspecting/testing and sealing 21,200 LF of sewer; performing 2900 LF of heavy cleaning; performing 5200 LF of root treatment; installing short liners at 61 locations; installing 3300 LF of CIP pipe; rehabilitating 61 manholes; grouting 60 service connections; installing two lateral liners; installing four manhole inflow dishes; and TV inspecting 2300 LF of sewer. Approximately 0.18 mgd of peak I/I was removed through the project.

The Year 3 Sewer System Infiltration Rehabilitation Design Project (Weymouth Contract PW-15-002-S / MWRA Project No. WRA-P9-39-3-909) was completed in June 2015. Rehabilitation Construction was completed in Summer 2016. Work included CIP lining of 3377 LF of 8 to 15-inch sewer main and 796 VF of cementitious interior manhole lining. Approximately 0.19 mgd of peak I/I was removed through the project.

Reporting Period Activity: The Year 7 Investigation is currently ongoing. Field investigations were completed Spring 2018. Data review/report preparation is ongoing.

The Year 6 Town-Wide Investigation Program (MWRA Project No. WRA-P9-39-2-965) began March 2017 (Subarea C-8) and was completed May 2017. Data review/report preparation was completed January 2018. The investigation identified

approximately 0.09 mgd of peak infiltration and 0.04 mgd of peak design storm inflow. Rehabilitation design (based on the Year 6 report recommendations) is currently ongoing with an anticipated bid opening of Fall 2018. Approximately 0.06 mgd of infiltration and 0.04 mgd of peak design storm inflow will be removed through rehabilitation construction.

The Year 5 Town-Wide Investigation Program (MWRA Project No. WRA-P9-39-3-940) began March 2016 (Subareas B-1 / B-4) and was completed May 2016. Project Summary report completed December 2016. The investigation identified approximately 0.06 mgd of infiltration and 0.10 of peak inflow.

MWRA I/I Local Financial Assistance Program: The community has financed seventeen (17) I/I reduction projects through the Authority's funding assistance program. Of the $19,100,900 allotted through the Program's Phases 1 - 13, the community has $10,465,000 remaining in funding assistance.

40. WILMINGTON: North System

Background Information:
- Miles of Sewer: 20
- Sewered Population: 4,833
- Three Year (CY15 - CY17) Annual Average I/I: 0.54 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: Sewer System Inspection Report (June 2003)
Infrastructure Maintenance & Management Program (IMMP) Phase 1 Report (June 2003)
Infrastructure Maintenance & Management Program (IMMP) Phase 2 Report (March 2005)
Infiltration/Inflow Analysis Report (December 2017)

Private Source Inflow Removal Program: Town continuing inspections on an as-needed basis.

I/I Rehabilitation Projects in Design or Construction: See below.

Reporting Period Activity: The Town-wide I/I Analysis Study and Report was competed and submitted to DEP in December 2017. SSES activities conducted in FY18 included CCTV inspection of 23,300 LF of pipe and 125 manhole inspections. Report comments were received from DEP on March 26, 2018 and the Town response to DEP was dated June 27, 2018. Smoke testing is planned for Summer 2018.

A private developer is currently constructing a new gravity sewer, pump station and force main along Lowell Street (Route 129) within the Woburn Street / Bay Street area. The project is scheduled for completion in late 2018. Additional new sewer connections and associated flows quantities to be determined.

MWRA I/I Local Financial Assistance Program: The community has financed six (6) I/I reduction projects through the Authority's funding assistance program. Of the $4,232,000 allotted through the Program's Phases 1 - 13, the community has $2,626,000 remaining in funding assistance.

41. WINCHESTER: North System

Background Information:
- Miles of Sewer: 83
- Sewered Population: 22,064
- Three Year (CY15 - CY17) Annual Average I/I: 0.96 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: West Side Building Inspection Report (May 2009)
Squire Road & Meter #4 Area Sewer System Evaluation Survey Final Report (June 2013)
Stowell & Marshall Road Sewer System Evaluation (January 2014)
Sewer System Evaluation Survey (SSES) Phase II (November 2016)

Private Source Inflow Removal Program: The Town's Private Inflow Source Removal Program is ongoing. No additional sump pumps were removed from the sewer system during this period.

I/I Rehabilitation Projects in Design or Construction: The design and bidding phase of the recommended sewer rehabilitations per the Phase II SSES in Meter Areas #1, 2, 6 & Leslie/ Lawson Subareas Report is ongoing. Construction will be performed in two phases, with Phase One starting in Fall 2018. Phase Two is scheduled to begin in Summer/ Fall 2019.

The Phase II SSES identified 77,223 gpd of removable infiltration and 22,456 gpd of removable inflow that is cost effective, value effective and non-excessive recommended to remove (Phase II SSES in Meter Areas 1, 2, 6 & Leslie/Lawson Subareas, November 2016).

Reporting Period Activity: See above.

In August 2017, $647,900 in grant/loan funds were distributed by MWRA for Winchester's construction of the Phase II SSES in Meter Areas #1, 2, 6 & Leslie/ Lawson Subareas. Details of this project are included in Attachment 4 (MWRA Project No. WRA-P9-41-3-973).

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the $6,793,000 allotted through the Program's Phases 1 - 13, the community has $2,610,000 remaining in funding assistance.

42. WINTHROP: North System

Background Information:

- Miles of Sewer: 36
- Sewered Population: 18,111
- Three Year (CY15 - CY17) Annual Average I/I: 0.85 mgd
- MassDEP Administrative Actions: NON – May 2018 Failed to submit I/I Analysis (due 12/31/17)

Latest I/I or SSES Report: Sanitary Sewer Evaluation Report (April 2007)
Sewer System I/I Assessment (April 2014)

Private Source Inflow Removal Program: The DPW, in partnership with the Town's Building & Plumbing Inspectors, continues to actively seek out illegal sump pump connections to the Town's sewer system.

I/I Rehabilitation Projects in Design or Construction: Design of Town Center Improvements to upgrade sewer mains on Woodside Avenue, Somerset Avenue, Bartlett Road, Adams Street, Williams Street and Cottage Park Avenue is ongoing. Administration changes, changes in project scope and funding concerns have slowed the design progress while the Town works through these challenges. Project Construction is anticipated to begin in the next two years. This design work includes improvements to the sewer system as recommended from the video inspections conducted as part of the Sanitary Sewer Evaluation Report (April 2007). The design work involves conducting survey, boring, flow monitoring, permitting & preparing Contract Documents for the replacement of approximately 2400 LF of sewer, manholes and service laterals (to the property line). The estimated annual I/I reduction is 0.02 mgd (MWRA Project No. WRA-P9-42-3-946).

Reporting Period Activity: See description of work under "I/I Rehabilitation Projects in Design or Construction".

Winthrop Contract 5: The Town constructed a water main improvements project that included some minor drainage improvements. During construction, it was discovered a catch basin on Taylor Street was connected to the sewer. The connection was removed as part of the drainage improvements for the project.

MWRA I/I Local Financial Assistance Program: The community has financed ten (10) I/I reduction projects through the Authority's funding assistance program. Of the $5,553,400 allotted through the Program's Phases 1 - 13, the community has $2,746,000 remaining in funding assistance.

43. WOBURN: North System

Background Information:

- Miles of Sewer: 141
- Sewered Population: 38,262
- Three Year (CY15 - CY17) Annual Average I/I: 2.25 mgd
- MassDEP Administrative Actions: ACO 2005 (September 2005)
  ACO-NE-01-1005 (August 2001)
  Revised AO Docket No. 619 (November 1984)

Latest I/I or SSES Report:

Area #3 Sanitary Sewer Rehabilitation – Post Rehabilitation Flow Evaluation Report (May 2011)
Arlington Road Area Sanitary Sewer Rehabilitation – Post Rehabilitation Flow Evaluation Report (May 2011)
East Woburn Sewer Collection System Capital Improvement Plan (October 2011)
CIP Smoke Testing – Project 1 Final Report (February 2014)
CIP Project 1 - Sewer Investigation and Evaluation Final Report (March 2014)
CIP Project 2 - Sewer Investigation and Evaluation Final Report (February 2015)
CIP Project 3 - Sewer Investigation and Evaluation Final Report (April 2016)
CIP Project 4 - Sewer Investigation and Evaluation Final Report (March 2017)

Private Source Inflow Removal Program: Under the current ACO, a 10:1 flow reduction is required. No activity occurred during this period.

I/I Rehabilitation Projects in Design or Construction: CIP Project 2 Sewer Rehabilitation Construction was completed in July 2018. The project included installation of 17,000 LF of CIPP manhole-to-manhole liners and cementitious lining of 144 manholes. Warranty Retesting work is scheduled for Spring 2019.

Reporting Period Activity: Ongoing sewer work for FY18 included:

- Installed 462 LF of sanitary sewer to replace the Hill Street (easement) sewer. The Hill Street sewer historically experienced backups and overflows due to collapsed pipe; the sewer discharged to the North Woburn Trunk Sewer. The new sewer discharges to a local sewer on Montvale Avenue.
- Seventy-nine (79) sewer blockages were repaired/cleared.
- Two (2) residential properties were converted from septic to city sewer.
- Three hundred thirty-nine (339) properties were added to city sewer.
- Five (5) properties were razed and replaced with new homes and services.
- Four (4) commercial properties were added to city sewer.
- Eight (8) properties were upgraded/repaired to mitigate infiltration.

In November 2017, $1,733,000 in grant/loan funds were distributed by MWRA for Woburn's construction of recommended sewer rehabilitations in CIP Project 1 & 2 Areas. Details of this project are included in Attachment 4 (MWRA Project No. WRA-P9-43-3-977).

MWRA I/I Local Financial Assistance Program: The community has financed eleven (11) I/I reduction projects through the Authority's funding assistance program. Of the $16,665,500 allotted through the Program's Phases 1 - 13, the community has $5,970,000 remaining in funding assistance.

ATTACHMENT 6
TO
MWRA ANNUAL I/I REDUCTION REPORT FOR FY18
Reporting Period – July 2017 Through June 2018

CY16 COMMUNITY WASTEWATER FLOW DATA

This attachment contains calendar year 2017 wastewater flow data for the 43 MWRA member sewer communities. There are four separate data tables as detailed below.

TABLE 1 (one page - page number 2) presents the CY17 MWRA Wastewater Metering System Community Flow Estimates. This data is monthly total wastewater flow estimates for each of the 43-member sewer communities derived from MWRA's wastewater metering system. Each community's percent share average daily flow and percent share maximum month flow are used as components of MWRA's annual wholesale sewer charge.

TABLE 2 (one page - page number 3) presents the CY17 MWRA Community Wastewater Flow Component Estimates. This data is developed through an engineering analysis by MWRA staff to estimate wastewater flow components, including: dry day average daily flow, average daily infiltration, average daily sanitary flow, and average daily inflow. The data in TABLE 2 is annual data. The percent share for each estimated flow component is also presented. The data presented in TABLE 2 is a summary of the more detailed monthly flow component analysis presented in TABLE 4. The estimated average daily sanitary flow (non-I/I flow) includes: residential, commercial, industrial, and institutional flows.

TABLE 3 (one page - page 4) presents the CY17 Community Wastewater Flow Component Estimates with additional information based on estimated community inch-diameter-miles of sewer.

TABLE 4 (13 pages - page numbers 5 through 17) presents the Estimated Community Wastewater Flow Components for CY17. This data is developed through an engineering analysis by MWRA staff of each community's monthly wastewater flow (derived from MWRA's wastewater metering system) to estimate flow components, including: dry day average daily flow, average daily infiltration, average daily sanitary flow, and average daily inflow. The data listed as MWRA Estimated Infiltration is a calculated estimate of the infiltration entering MWRA-owned sewers that are upstream of wastewater flow meters within a community. The calculation is a weighted allocation of the Raw Estimated Infiltration to the portion of the sewer system that is MWRA-owned versus community-owned. The weighted allocation is based on inch-diameter-miles of MWRA-owned and community-owned sewer. The data presented in TABLE 4 is also presented in TABLE 2 as an annual summary.

TABLE 1 - CY17 MWRA WASTEWATER METERING SYSTEM COMMUNITY FLOW ESTIMATES

Community	Total Population	Sewered Population	CY17 Average Daily Flow (ADF) By Calendar Month (MGD)												12 Month Average Daily Flow (MGD)	Percent Average Daily Flow	Max. Month ADF (MGD)	Percent Max. Month ADF
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
Arlington	44,028	43,993	5.81	5.71	5.68	9.31	5.85	4.98	4.06	3.01	2.88	3.04	3.79	3.66	4.80	1.6%	9.31	1.9%
Ashland	17,150	13,549	1.62	1.52	1.51	2.01	1.54	1.40	1.17	1.11	1.07	1.09	1.18	1.19	1.37	0.5%	2.01	0.4%
Bedford	13,975	13,394	2.75	2.80	2.92	4.22	3.16	2.74	2.33	1.95	1.76	1.91	2.07	2.05	2.55	0.8%	4.22	0.9%
Belmont	25,332	24,927	3.46	3.36	3.16	6.05	3.26	2.87	2.26	1.78	1.66	1.87	2.21	2.02	2.82	0.9%	6.05	1.2%
BWSC	645,966	645,320	94.50	89.89	87.60	129.21	91.05	93.43	82.11	76.78	79.29	83.82	77.78	74.76	88.27	29.1%	129.21	26.1%
Braintree	36,727	36,573	7.30	7.58	7.01	11.97	7.97	7.32	5.06	4.27	3.92	4.16	5.11	5.31	6.40	2.1%	11.97	2.4%
Brookline	59,128	59,069	10.28	9.46	8.61	14.52	8.97	8.46	5.85	4.96	5.18	5.59	6.04	5.49	7.76	2.6%	14.52	2.9%
Burlington	25,463	24,826	3.96	3.97	4.01	5.72	4.38	3.94	3.11	2.62	2.46	2.40	2.80	2.86	3.51	1.2%	5.72	1.2%
Cambridge	107,289	107,278	18.32	17.06	16.83	24.21	20.57	20.13	17.95	15.38	15.77	16.82	15.31	13.92	17.68	5.8%	24.21	4.9%
Canton	22,221	15,088	3.23	3.06	2.95	4.74	3.14	3.18	2.68	2.24	2.20	2.63	2.99	2.81	2.98	1.0%	4.74	1.0%
Chelsea	37,670	37,670	5.83	5.44	5.30	7.50	5.34	5.56	5.22	4.07	4.55	4.92	4.68	4.58	5.24	1.7%	7.50	1.5%
Dedham	25,299	23,098	4.16	4.25	4.29	6.81	4.58	4.33	2.94	2.53	2.38	2.52	2.98	2.92	3.72	1.2%	6.81	1.4%
Everett	42,935	42,935	6.07	6.00	5.73	8.19	6.02	5.88	5.39	4.80	4.85	5.18	4.94	4.83	5.65	1.9%	8.19	1.7%
Framingham	70,441	67,680	7.64	7.57	7.40	10.60	8.18	7.72	6.19	5.48	5.36	5.47	6.28	6.60	7.03	2.3%	10.60	2.1%
Hingham	7,350	6,809	1.74	1.73	1.58	2.45	1.49	1.43	0.99	0.80	0.73	0.78	0.98	1.04	1.31	0.4%	2.45	0.5%
Holbrook	10,952	9,671	1.00	1.02	0.99	1.25	0.95	0.92	0.73	0.65	0.62	0.67	0.75	0.80	0.86	0.3%	1.25	0.3%
Lexington	32,650	32,030	5.71	5.79	5.88	9.27	6.50	5.61	4.67	3.43	3.05	2.63	3.57	3.70	4.97	1.6%	9.27	1.9%
Malden	60,509	60,206	10.50	10.25	9.33	13.31	9.85	8.71	7.40	6.47	6.23	6.80	7.61	7.41	8.64	2.8%	13.31	2.7%
Medford	57,170	57,113	9.44	8.88	8.50	13.93	8.39	7.85	6.54	5.21	5.21	5.47	6.26	5.98	7.62	2.5%	13.93	2.8%
Melrose	27,690	27,662	5.89	5.55	4.99	8.83	5.11	4.52	3.18	2.70	2.49	2.70	3.23	3.00	4.33	1.4%	8.83	1.8%
Milton	27,270	26,534	3.92	4.06	3.78	6.76	4.02	3.76	2.21	1.85	1.67	1.93	2.44	2.44	3.23	1.1%	6.76	1.4%
Natick	35,214	31,351	3.31	3.00	2.92	4.39	3.23	3.10	2.08	2.00	1.90	1.89	2.11	2.18	2.67	0.9%	4.39	0.9%
Needham	29,736	28,089	4.57	4.10	4.01	7.04	4.61	4.02	2.63	2.32	2.32	2.40	2.98	2.87	3.65	1.2%	7.04	1.4%
Newton	87,971	87,003	18.68	18.01	17.55	28.62	17.36	15.87	10.99	9.20	8.74	8.94	10.57	10.16	14.51	4.8%	28.62	5.8%
Norwood	28,951	28,795	6.18	6.35	6.25	9.92	6.86	6.58	4.67	4.09	3.94	4.12	5.19	5.05	5.75	1.9%	9.92	2.0%
Quincy	93,494	93,494	14.37	14.63	13.52	20.61	14.30	14.53	11.83	10.60	9.56	10.25	11.17	10.58	12.97	4.3%	20.61	4.2%
Randolph	33,456	33,423	4.78	5.08	4.79	6.43	4.28	4.44	3.33	2.81	2.64	2.84	3.42	3.39	4.01	1.3%	6.43	1.3%
Reading	25,327	24,719	3.72	3.64	3.60	5.45	3.76	3.25	2.32	1.90	1.74	1.71	2.13	2.21	2.94	1.0%	5.45	1.1%
Revere	53,756	53,702	7.29	6.88	5.91	9.76	6.86	6.72	5.87	4.26	4.41	5.19	5.40	5.22	6.14	2.0%	9.76	2.0%
Somerville	78,804	78,804	12.12	11.07	10.40	17.53	11.49	11.10	9.47	6.76	7.75	9.65	8.43	8.10	10.31	3.4%	17.53	3.5%
Stoneham	21,734	21,401	3.53	3.41	3.35	5.04	3.74	3.03	1.85	1.64	1.68	1.86	2.33	2.35	2.81	0.9%	5.04	1.0%
Stoughton	28,106	19,112	3.23	3.45	3.37	4.92	3.66	3.35	2.49	2.00	1.85	2.03	2.51	2.53	2.94	1.0%	4.92	1.0%
Wakefield	26,080	26,007	5.20	5.12	5.07	8.26	5.56	4.47	3.20	2.58	2.28	2.26	2.73	2.87	4.12	1.4%	8.26	1.7%
Walpole	24,818	17,993	2.23	2.19	2.25	3.06	2.59	2.27	1.68	1.55	1.54	1.73	1.87	1.81	2.06	0.7%	3.06	0.6%
Waltham	62,227	61,318	10.18	9.81	9.47	13.18	10.52	9.56	8.36	7.02	6.59	6.69	7.34	7.06	8.80	2.9%	13.18	2.7%
Watertown	32,996	32,996	4.14	4.10	3.89	5.82	4.09	3.78	2.93	2.52	2.45	2.51	2.80	2.71	3.47	1.1%	5.82	1.2%
Wellesley	29,090	28,334	4.03	3.66	3.57	6.23	3.93	3.60	2.37	2.03	2.21	2.25	2.56	2.43	3.23	1.1%	6.23	1.3%
Westwood	14,876	14,564	2.14	2.33	2.36	2.93	2.08	1.89	1.35	1.25	1.19	1.22	1.41	1.42	1.79	0.6%	2.93	0.6%
Weymouth	55,419	53,646	10.57	10.20	9.30	13.69	9.95	9.65	6.71	5.54	5.03	5.53	6.89	7.33	8.35	2.7%	13.69	2.8%
Wilmington	23,147	4,833	1.51	1.50	1.52	1.94	1.64	1.58	1.27	1.22	1.23	1.26	1.32	1.35	1.44	0.5%	1.94	0.4%
Winchester	22,079	22,064	3.00	2.89	2.75	4.62	3.15	2.56	1.76	1.41	1.34	1.40	1.66	1.64	2.34	0.8%	4.62	0.9%
Winthrop	18,111	18,111	2.58	2.49	2.31	3.37	2.31	2.41	1.98	1.59	1.65	1.78	1.79	1.83	2.17	0.7%	3.37	0.7%
Woburn	39,083	38,262	7.26	6.95	6.97	10.77	7.18	6.73	5.78	5.13	5.04	5.16	5.82	5.49	6.51	2.1%	10.77	2.2%
Total/Average	2,261,690	2,193,444	347.75	335.81	323.18	494.44	343.47	329.23	266.96	231.51	230.41	245.07	255.43	247.95	303.75	100%	494.44	100%
Logan Airport Monthly Rainfall (in)			3.50	3.22	4.18	5.73	3.45	4.85	4.03	1.58	3.73	4.14	1.80	2.49				

TABLE 2 - 2017 MWRA COMMUNITY WASTEWATER FLOW COMPONENT ESTIMATES (CY17-12 MONTHS)

02-May-18

						2017 Averages (1)			Components of Average Daily Flow (Estimated) (2)							
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
COMMUNITY	Community Demographics		No. of Connects to MWRA System	Miles of Local Sewers (3)	No. of Meters for Permanent System	Average Daily Flow ADF (MGD)	Percent Average Daily Flow (6)	Selected Dry Day ADF (MGD)	Average Daily Infiltration (MGD)	Infiltration As a % of Average Daily Flow	Average Sanitary Flow (MGD)	Sanitary As a % of Average Daily Flow	Average Daily Inflow (4) (MGD)	Inflow As a % of Average Daily Flow	Peak Month ADF (MGD)	Percent Peak Month ADF (6)
	Total Population	Sewered Population														
Arlington	44,028	43,993	327	106	7	4.80	1.58%	4.38	1.88	39.2%	2.50	52.1%	0.42	8.7%	9.31	1.88%
Ashland	17,150	13,549	2	66	2	1.37	0.45%	1.31	0.51	37.2%	0.80	58.4%	0.06	4.4%	2.01	0.41%
Bedford	13,975	13,394	1	78	4	2.55	0.84%	2.40	1.10	43.1%	1.30	51.0%	0.15	5.9%	4.22	0.85%
Belmont	25,332	24,927	2	78	2	2.82	0.93%	2.45	1.05	37.2%	1.40	49.6%	0.37	13.1%	6.05	1.22%
BWSC (5)	645,966	645,320	255	858	33	88.27	29.06%	77.92	19.42	22.0%	58.50	66.3%	10.35	11.7%	129.21	26.13%
Braintree	36,727	36,573	21	140	8	6.40	2.11%	5.83	2.63	41.1%	3.20	50.0%	0.57	8.9%	11.97	2.42%
Brookline (5)	59,128	59,069	10	111	14	7.76	2.55%	6.78	2.58	33.2%	4.20	54.1%	0.98	12.6%	14.52	2.94%
Burlington	25,463	24,826	1	115	1	3.51	1.16%	3.36	1.36	38.7%	2.00	57.0%	0.15	4.3%	5.72	1.16%
Cambridge (5)	107,289	107,278	127	148	9	17.68	5.82%	15.15	3.65	20.6%	11.50	65.0%	2.53	14.3%	24.21	4.90%
Canton	22,221	15,088	65	62	6	2.98	0.98%	2.79	1.39	46.6%	1.40	47.0%	0.19	6.4%	4.74	0.96%
Chelsea (5)	37,670	37,670	47	41	8	5.24	1.73%	4.23	1.23	23.5%	3.00	57.3%	1.01	19.3%	7.50	1.52%
Dedham	25,299	23,098	30	95	8	3.72	1.22%	3.45	1.65	44.4%	1.80	48.4%	0.27	7.3%	6.81	1.38%
Everett	42,935	42,935	21	57	6	5.65	1.86%	5.16	1.96	34.7%	3.20	56.6%	0.49	8.7%	8.19	1.66%
Framingham	70,441	67,680	2	275	4	7.03	2.31%	6.74	1.94	27.6%	4.80	68.3%	0.30	4.3%	10.60	2.14%
Hingham	7,350	6,809	1	33	1	1.31	0.43%	1.22	0.72	55.0%	0.50	38.2%	0.09	6.9%	2.45	0.50%
Holbrook	10,952	9,671	2	31	2	0.86	0.28%	0.81	0.31	36.0%	0.50	58.1%	0.05	5.8%	1.25	0.25%
Lexington	32,650	32,030	17	170	6	4.97	1.64%	4.65	2.45	49.3%	2.20	44.3%	0.32	6.4%	9.27	1.87%
Malden	60,509	60,206	242	100	6	8.64	2.84%	8.02	3.12	36.1%	4.90	56.7%	0.62	7.2%	13.31	2.69%
Medford	57,170	57,113	74	113	6	7.62	2.51%	6.78	2.58	33.9%	4.20	55.1%	0.84	11.0%	13.93	2.82%
Melrose	27,690	27,662	188	74	5	4.33	1.43%	3.84	2.04	47.1%	1.80	41.6%	0.50	11.5%	8.83	1.79%
Milton	27,270	26,534	56	83	13	3.23	1.06%	2.89	1.49	46.1%	1.40	43.3%	0.34	10.5%	6.76	1.37%
Natick	35,214	31,351	30	135	4	2.67	0.88%	2.54	0.74	27.7%	1.80	67.4%	0.13	4.9%	4.39	0.89%
Needham	29,736	28,089	21	132	2	3.65	1.20%	3.38	1.48	40.5%	1.90	52.1%	0.27	7.4%	7.04	1.42%
Newton	87,971	87,003	52	271	7	14.51	4.78%	13.38	5.58	38.5%	7.80	53.8%	1.13	7.8%	28.62	5.79%
Norwood	28,951	28,795	31	108	6	5.75	1.89%	5.35	2.95	51.3%	2.40	41.7%	0.40	7.0%	9.92	2.01%
Quincy	93,494	93,494	56	202	6	12.97	4.27%	12.10	3.90	30.1%	8.20	63.2%	0.87	6.7%	20.61	4.17%
Randolph	33,456	33,423	2	101	2	4.01	1.32%	3.74	1.84	45.9%	1.90	47.4%	0.26	6.5%	6.43	1.30%
Reading	25,327	24,719	2	96	2	2.94	0.97%	2.75	1.45	49.3%	1.30	44.2%	0.20	6.8%	5.45	1.10%
Revere	53,756	53,702	3	98	2	6.14	2.02%	5.40	1.90	30.9%	3.50	57.0%	0.74	12.1%	9.76	1.97%
Somerville (5)	78,804	78,804	43	128	8	10.31	3.39%	7.74	2.24	21.7%	5.50	53.3%	2.57	24.9%	17.53	3.55%
Stoneham	21,734	21,401	27	63	7	2.81	0.93%	2.63	1.23	43.8%	1.40	49.8%	0.18	6.4%	5.04	1.02%
Stoughton	28,106	19,112	1	88	2	2.94	0.97%	2.80	1.40	47.6%	1.40	47.6%	0.15	5.1%	4.92	1.00%
Wakefield	26,080	26,007	11	93	2	4.12	1.36%	3.82	2.32	56.3%	1.50	36.4%	0.30	7.3%	8.26	1.67%
Walpole	24,818	17,993	1	59	2	2.06	0.68%	1.96	0.76	36.9%	1.20	58.3%	0.10	4.9%	3.06	0.62%
Waltham	62,227	61,318	5	138	4	8.80	2.90%	8.37	2.77	31.5%	5.60	63.6%	0.43	4.9%	13.18	2.67%
Watertown	32,996	32,996	14	75	3	3.47	1.14%	3.20	1.00	28.8%	2.20	63.4%	0.27	7.8%	5.82	1.18%
Wellesley	29,090	28,334	2	134	3	3.23	1.06%	2.99	1.29	39.9%	1.70	52.6%	0.24	7.4%	6.23	1.26%
Westwood	14,876	14,564	3	77	3	1.79	0.59%	1.68	0.78	43.6%	0.90	50.3%	0.11	6.1%	2.93	0.59%
Weymouth	55,419	53,646	19	238	4	8.35	2.75%	7.78	4.08	48.9%	3.70	44.3%	0.56	6.7%	13.69	2.77%
Wilmington	23,147	4,833	2	20	1	1.44	0.47%	1.40	0.60	41.7%	0.80	55.6%	0.05	3.5%	1.94	0.39%
Winchester	22,079	22,064	102	83	7	2.34	0.77%	2.16	1.06	45.3%	1.10	47.0%	0.18	7.7%	4.62	0.93%
Winthrop	18,111	18,111	22	36	4	2.17	0.71%	1.95	0.85	39.2%	1.10	50.7%	0.22	10.1%	3.37	0.68%
Woburn	39,083	38,262	18	141	13	6.51	2.14%	6.07	2.37	36.4%	3.70	56.8%	0.44	6.8%	10.77	2.18%
Totals/Averages	2,261,690	2,193,444	1,958	5,350		303.75	100.00%	273.35	97.65	32.1%	175.70	57.8%	30.40	10.0%	494.44	100.00%

FOOTNOTES:

(1) Figures tabulated using data from the MWRA Wastewater Metering System for Calendar Year 2017.

(2) Wastewater flow components are estimated through engineering analysis by MWRA staff.

(3) Miles of Local Sewers are from MWRA's regional collection system database or as reported by the Community and do not include service laterals.

(4) Average Daily Inflow is calculated as a total inflow over the period of January through December 2017 divided by 365 days. Actual inflow during a specific storm event must be calculated separately.

(5) Community with combined sewers. Inflow figures include combined flow during storm events tributary to MWRA's WWTP.

(6) Percent average Daily Flow and Percent Peak Month ADF are the two flow-based components of MWRA's Wholesale Sewer Rate Methodology.

Column Summations: **Average Daily Flow (ADF) Column F = I+K+M** **Average Dry Day Flow Column H = I+K**

TABLE 3 - 2017 Final Community Wastewater Flow Component Estimates

Community	Sewered Population	Miles of Local Sewers	IDM of Local Sewers	Average Daily Flow ADF (MGD)	Average Annual Infiltration (MGD)	Average Annual Inflow (MGD)	Average Sanitary Flow (MGD)	ADF (GPD Per IDM)	I/I (GPD Per IDM)	Infiltration (GPD Per IDM)	Inflow (GPD Per IDM)	Inflow (GPD Per Sewer Mile)	Average Sanitary (GPD Per Sew. Pop.)
Arlington	43,993	106	954	4.80	1.88	0.42	2.50	5,031	2,411	1,971	440	3,962	57
Ashland	13,549	66	594	1.37	0.51	0.06	0.80	2,306	960	859	101	909	59
Bedford	13,394	78	738	2.55	1.10	0.15	1.30	3,455	1,694	1,491	203	1,923	97
Belmont	24,927	78	708	2.82	1.05	0.37	1.40	3,983	2,006	1,483	523	4,744	56
BWSC	645,320	858	14,024	88.27	19.42	10.35	58.50	6,294	2,123	1,385	738	12,063	91
Braintree	36,573	140	1,300	6.40	2.63	0.57	3.20	4,923	2,462	2,023	438	4,071	87
Brookline	59,069	111	1,332	7.76	2.58	0.98	4.20	5,826	2,673	1,937	736	8,829	71
Burlington	24,826	115	1,150	3.51	1.36	0.15	2.00	3,052	1,313	1,183	130	1,304	81
Cambridge	107,278	148	2,368	17.68	3.65	2.53	11.50	7,466	2,610	1,541	1,068	17,095	107
Canton	15,088	62	567	2.98	1.39	0.19	1.40	5,256	2,787	2,451	335	3,065	93
Chelsea	37,670	41	618	5.24	1.23	1.01	3.00	8,479	3,625	1,990	1,634	24,634	80
Dedham	23,098	95	832	3.72	1.65	0.27	1.80	4,471	2,308	1,983	325	2,842	78
Everett	42,935	57	686	5.65	1.96	0.49	3.20	8,236	3,571	2,857	714	8,596	75
Framingham	67,680	275	2,750	7.03	1.94	0.30	4.80	2,556	815	705	109	1,091	71
Hingham	6,809	33	297	1.31	0.72	0.09	0.50	4,411	2,727	2,424	303	2,727	73
Holbrook	9,671	31	312	0.86	0.31	0.05	0.50	2,756	1,154	994	160	1,613	52
Lexington	32,030	170	1,763	4.97	2.45	0.32	2.20	2,819	1,571	1,390	182	1,882	69
Malden	60,206	100	1,000	8.64	3.12	0.62	4.90	8,640	3,740	3,120	620	6,200	81
Medford	57,113	113	1,130	7.62	2.58	0.84	4.20	6,743	3,027	2,283	743	7,434	74
Melrose	27,662	74	641	4.33	2.04	0.50	1.80	6,755	3,963	3,183	780	6,798	65
Milton	26,534	83	747	3.23	1.49	0.34	1.40	4,324	2,450	1,995	455	4,096	53
Natick	31,351	135	1,180	2.67	0.74	0.13	1.80	2,263	737	627	110	963	57
Needham	28,089	132	1,232	3.65	1.48	0.27	1.90	2,963	1,420	1,201	219	2,045	68
Newton	87,003	271	2,710	14.51	5.58	1.13	7.80	5,354	2,476	2,059	417	4,170	90
Norwood	28,795	108	1,091	5.75	2.95	0.40	2.40	5,270	3,071	2,704	367	3,704	83
Quincy	93,494	202	2,020	12.97	3.90	0.87	8.20	6,421	2,361	1,931	431	4,307	88
Randolph	33,423	101	1,138	4.01	1.84	0.26	1.90	3,524	1,845	1,617	228	2,574	57
Reading	24,719	96	864	2.94	1.45	0.20	1.30	3,403	1,910	1,678	231	2,083	53
Revere	53,702	98	1,434	6.14	1.90	0.74	3.50	4,282	1,841	1,325	516	7,551	65
Somerville	78,804	128	1,920	10.31	2.24	2.57	5.50	5,370	2,505	1,167	1,339	20,078	70
Stoneham	21,401	63	567	2.81	1.23	0.18	1.40	4,956	2,487	2,169	317	2,857	65
Stoughton	19,112	88	888	2.94	1.40	0.15	1.40	3,311	1,745	1,577	169	1,705	73
Wakefield	26,007	93	888	4.12	2.32	0.30	1.50	4,640	2,950	2,613	338	3,226	58
Walpole	17,993	59	577	2.06	0.76	0.10	1.20	3,570	1,490	1,317	173	1,695	67
Waltham	61,318	138	1,380	8.80	2.77	0.43	5.60	6,377	2,319	2,007	312	3,116	91
Watertown	32,996	75	675	3.47	1.00	0.27	2.20	5,141	1,881	1,481	400	3,600	67
Wellesley	28,334	134	1,340	3.23	1.29	0.24	1.70	2,410	1,142	963	179	1,791	60
Westwood	14,564	77	693	1.79	0.78	0.11	0.90	2,583	1,284	1,126	159	1,429	62
Weymouth	53,646	238	2,380	8.35	4.08	0.56	3.70	3,508	1,950	1,714	235	2,353	69
Wilmington	4,833	20	280	1.44	0.60	0.05	0.80	5,143	2,321	2,143	179	2,500	166
Winchester	22,064	83	747	2.34	1.06	0.18	1.10	3,133	1,660	1,419	241	2,169	50
Winthrop	18,111	36	324	2.17	0.85	0.22	1.10	6,698	3,302	2,623	679	6,111	61
Woburn	38,262	141	1,410	6.51	2.37	0.44	3.70	4,617	1,993	1,681	312	3,121	97
Total	2,193,444	5,350	60,249	303.7	97.6	30.4	175.7						
Average	51,010	124	1,401	7.1	2.3	0.7	4.1	4,714	2,202	1,776	425	4,861	74

Table 4 - Estimated Community Wastewater Flow Components for 2017 — 2-May-18 —

Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (MGD)
Ashland	Average Daily Flow	1.62	1.52	1.51	2.01	1.54	1.40	1.17	1.11	1.07	1.09	1.18	1.19	1.37
	Dry Day Average Daily Flow	1.57	1.49	1.46	1.78	1.46	1.33	1.14	1.08	1.04	1.07	1.16	1.14	1.31
	Estimated Infiltration	0.77	0.69	0.66	0.98	0.66	0.53	0.34	0.28	0.24	0.27	0.36	0.34	0.51
	Estimated Sanitary Flow	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	Estimated Inflow	0.05	0.03	0.05	0.23	0.08	0.07	0.03	0.03	0.03	0.02	0.02	0.05	0.06
Boston (South Only)	Raw Average Daily Flow	22.79	21.69	19.95	43.88	22.18	21.21	15.16	14.02	12.98	14.60	14.83	15.65	19.86
	Raw Dry Day Average Daily Flow	20.28	21.18	18.66	33.77	19.89	17.90	14.67	12.97	12.09	11.73	14.28	15.10	17.66
	Raw Estimated Infiltration	11.98	12.88	10.36	25.47	11.59	9.60	6.37	4.67	3.79	3.43	5.98	6.80	9.36
	MWRA Estimated Infiltration	4.66	5.01	4.03	9.91	4.51	3.74	2.48	1.82	1.48	1.33	2.33	2.65	3.64
	Final Average Daily Flow	18.13	16.68	15.92	33.97	17.67	17.47	12.68	12.20	11.50	13.27	12.50	13.00	16.22
	Final Dry Day Average Daily Flow	15.62	16.17	14.63	23.86	15.38	14.16	12.19	11.15	10.61	10.40	11.95	12.45	14.02
	Final Estimated Infiltration	7.32	7.87	6.33	15.56	7.08	5.86	3.89	2.85	2.31	2.10	3.65	4.15	5.72
	Estimated Sanitary Flow	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30
	Estimated Inflow	2.51	0.51	1.29	10.11	2.29	3.31	0.49	1.05	0.89	2.87	0.55	0.55	2.20
Braintree	Raw Average Daily Flow	7.95	8.29	7.66	13.00	8.65	7.85	5.32	4.39	4.00	4.27	5.43	5.66	6.85
	Raw Dry Day Average Daily Flow	7.62	8.03	7.58	10.19	7.80	6.78	4.99	4.04	3.71	3.95	5.36	5.56	6.28
	Raw Estimated Infiltration	4.42	4.83	4.38	6.99	4.60	3.58	1.79	0.84	0.51	0.75	2.16	2.36	3.08
	MWRA Estimated Infiltration	0.65	0.71	0.65	1.03	0.68	0.53	0.26	0.12	0.08	0.11	0.32	0.35	0.46
	Final Average Daily Flow	7.30	7.58	7.01	11.97	7.97	7.32	5.06	4.27	3.92	4.16	5.11	5.31	6.40
	Final Dry Day Average Daily Flow	6.97	7.32	6.93	9.16	7.12	6.25	4.73	3.92	3.63	3.84	5.04	5.21	5.83
	Final Estimated Infiltration	3.77	4.12	3.73	5.96	3.92	3.05	1.53	0.72	0.43	0.64	1.84	2.01	2.63
	Estimated Sanitary Flow	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
	Estimated Inflow	0.33	0.26	0.08	2.81	0.85	1.07	0.33	0.35	0.29	0.32	0.07	0.10	0.57
Brookline (South Only)	Raw Average Daily Flow	7.47	6.63	5.91	10.61	5.93	5.40	3.13	2.43	2.66	2.97	3.59	3.18	4.97
	Raw Dry Day Average Daily Flow	6.57	5.59	5.55	7.06	5.19	4.24	2.86	2.17	2.39	2.17	3.50	3.16	4.19
	Raw Estimated Infiltration	4.47	3.49	3.45	4.96	3.09	2.14	0.76	0.07	0.29	0.07	1.40	1.06	2.09
	MWRA Estimated Infiltration	0.03	0.02	0.02	0.04	0.02	0.02	0.01	0.00	0.00	0.00	0.01	0.01	0.01
	Final Average Daily Flow	7.44	6.61	5.89	10.57	5.91	5.38	3.12	2.43	2.66	2.97	3.58	3.17	4.96
	Final Dry Day Average Daily Flow	6.54	5.57	5.53	7.02	5.17	4.22	2.85	2.17	2.39	2.17	3.49	3.15	4.18
	Final Estimated Infiltration	4.44	3.47	3.43	4.92	3.07	2.12	0.75	0.07	0.29	0.07	1.39	1.05	2.08
	Estimated Sanitary Flow	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
	Estimated Inflow	0.90	1.04	0.36	3.55	0.74	1.16	0.27	0.26	0.27	0.80	0.09	0.02	0.78
Canton	Raw Average Daily Flow	3.50	3.30	3.18	5.09	3.37	3.44	2.87	2.36	2.31	2.77	3.21	3.02	3.20
	Raw Dry Day Average Daily Flow	3.40	3.24	3.16	4.02	3.14	3.32	2.80	2.30	2.23	2.47	3.08	2.98	3.01
	Raw Estimated Infiltration	2.00	1.84	1.76	2.62	1.74	1.92	1.40	0.90	0.83	1.07	1.68	1.58	1.61
	MWRA Estimated Infiltration	0.27	0.24	0.23	0.35	0.23	0.26	0.19	0.12	0.11	0.14	0.22	0.21	0.21
	Final Average Daily Flow	3.23	3.06	2.95	4.74	3.14	3.18	2.68	2.24	2.20	2.63	2.99	2.81	2.98
	Final Dry Day Average Daily Flow	3.13	3.00	2.93	3.67	2.91	3.06	2.61	2.18	2.12	2.33	2.86	2.77	2.79
	Final Estimated Infiltration	1.73	1.60	1.53	2.27	1.51	1.66	1.21	0.78	0.72	0.93	1.46	1.37	1.39
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
	Estimated Inflow	0.10	0.06	0.02	1.07	0.23	0.12	0.07	0.06	0.08	0.30	0.13	0.04	0.19
Dedham	Average Daily Flow	4.16	4.25	4.29	6.81	4.58	4.33	2.94	2.53	2.38	2.52	2.98	2.92	3.72
	Dry Day Average Daily Flow	4.07	4.18	4.20	5.44	4.26	3.91	2.83	2.41	2.19	2.27	2.85	2.87	3.45
	Estimated Infiltration	2.27	2.38	2.40	3.64	2.46	2.11	1.03	0.61	0.39	0.47	1.05	1.07	1.65
	Estimated Sanitary Flow	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
	Estimated Inflow	0.09	0.07	0.09	1.37	0.32	0.42	0.11	0.12	0.19	0.25	0.13	0.05	0.27

Table 4 - Estimated Community Wastewater Flow Components for 2017												2-May-18	PAGE 2	Annual Average
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(MGD)
Framingham	Average Daily Flow	7.64	7.57	7.40	10.60	8.18	7.72	6.19	5.48	5.36	5.47	6.28	6.60	7.03
	Dry Day Average Daily Flow	7.37	7.44	7.26	9.37	7.80	7.30	6.02	5.39	5.18	5.18	6.23	6.39	6.74
	Estimated Infiltration	2.57	2.64	2.46	4.57	3.00	2.50	1.22	0.59	0.38	0.38	1.43	1.59	1.94
	Estimated Sanitary Flow	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80
	Estimated Inflow	0.27	0.13	0.14	1.23	0.38	0.42	0.17	0.09	0.18	0.29	0.05	0.21	0.30
Hingham	Average Daily Flow	1.74	1.73	1.58	2.45	1.49	1.43	0.99	0.80	0.73	0.78	0.98	1.04	1.31
	Dry Day Average Daily Flow	1.67	1.71	1.55	1.92	1.39	1.27	0.95	0.75	0.71	0.71	0.98	1.03	1.22
	Estimated Infiltration	1.17	1.21	1.05	1.42	0.89	0.77	0.45	0.25	0.21	0.21	0.48	0.53	0.72
	Estimated Sanitary Flow	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
	Estimated Inflow	0.07	0.02	0.03	0.53	0.10	0.16	0.04	0.05	0.02	0.07	0.00	0.01	0.09
Holbrook	Average Daily Flow	1.00	1.02	0.99	1.25	0.95	0.92	0.73	0.65	0.62	0.67	0.75	0.80	0.86
	Dry Day Average Daily Flow	0.98	0.95	0.98	1.04	0.88	0.85	0.71	0.62	0.61	0.64	0.75	0.76	0.81
	Estimated Infiltration	0.48	0.45	0.48	0.54	0.38	0.35	0.21	0.12	0.11	0.14	0.25	0.26	0.31
	Estimated Sanitary Flow	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
	Estimated Inflow	0.02	0.07	0.01	0.21	0.07	0.07	0.02	0.03	0.01	0.03	0.00	0.04	0.05
Milton (South Only)	Average Daily Flow	3.63	3.75	3.49	6.18	3.68	3.47	2.01	1.66	1.47	1.71	2.20	2.20	2.94
	Dry Day Average Daily Flow	3.35	3.68	3.43	4.63	3.28	2.78	1.83	1.54	1.40	1.49	2.15	2.08	2.63
	Estimated Infiltration	2.10	2.43	2.18	3.38	2.03	1.53	0.58	0.29	0.15	0.24	0.90	0.83	1.38
	Estimated Sanitary Flow	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
	Estimated Inflow	0.28	0.07	0.06	1.55	0.40	0.69	0.18	0.12	0.07	0.22	0.05	0.12	0.32
Natick	Average Daily Flow	3.31	3.00	2.92	4.39	3.23	3.10	2.08	2.00	1.90	1.89	2.11	2.18	2.67
	Dry Day Average Daily Flow	3.23	2.98	2.81	3.76	3.11	2.73	2.07	1.95	1.86	1.81	2.10	2.12	2.54
	Estimated Infiltration	1.43	1.18	1.01	1.96	1.31	0.93	0.27	0.15	0.06	0.01	0.30	0.32	0.74
	Estimated Sanitary Flow	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
	Estimated Inflow	0.08	0.02	0.11	0.63	0.12	0.37	0.01	0.05	0.04	0.08	0.01	0.06	0.13
Needham	Average Daily Flow	4.57	4.10	4.01	7.04	4.61	4.02	2.63	2.32	2.32	2.40	2.98	2.87	3.65
	Dry Day Average Daily Flow	4.38	3.98	3.90	5.74	4.28	3.55	2.50	2.18	2.23	2.22	2.85	2.79	3.38
	Estimated Infiltration	2.48	2.08	2.00	3.84	2.38	1.65	0.60	0.28	0.33	0.32	0.95	0.89	1.48
	Estimated Sanitary Flow	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
	Estimated Inflow	0.19	0.12	0.11	1.30	0.33	0.47	0.13	0.14	0.09	0.18	0.13	0.08	0.27
Newton (South Only)	Raw Average Daily Flow	11.69	11.17	10.94	17.22	10.50	9.66	6.24	5.17	4.90	5.12	6.17	5.90	8.69
	Raw Dry Day Average Daily Flow	10.96	10.15	10.34	14.24	9.40	8.53	6.04	4.87	4.73	4.27	5.91	5.73	7.91
	Raw Estimated Infiltration	6.86	6.05	6.24	10.14	5.30	4.43	1.94	0.77	0.63	0.17	1.81	1.63	3.81
	MWRA Estimated Infiltration	0.02	0.02	0.02	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01
	Final Average Daily Flow	11.67	11.15	10.92	17.19	10.49	9.65	6.23	5.17	4.90	5.12	6.17	5.90	8.68
	Final Dry Day Average Daily Flow	10.94	10.13	10.32	14.21	9.39	8.52	6.03	4.87	4.73	4.27	5.91	5.73	7.90
	Final Estimated Infiltration	6.84	6.03	6.22	10.11	5.29	4.42	1.93	0.77	0.63	0.17	1.81	1.63	3.80
	Estimated Sanitary Flow	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10
	Estimated Inflow	0.73	1.02	0.60	2.98	1.10	1.13	0.20	0.30	0.17	0.85	0.26	0.17	0.79

Table 4 - Estimated Community Wastewater Flow Components for 2017														2-May-18 PAGE 3 Annual Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Norwood	Raw Average Daily Flow	6.58	6.79	6.65	10.64	7.29	6.98	4.91	4.26	4.11	4.27	5.49	5.34	6.10
	Raw Dry Day Average Daily Flow	6.23	6.66	6.29	9.31	6.60	6.31	4.71	4.09	4.04	3.81	5.27	5.19	5.70
	Raw Estimated Infiltration	3.83	4.26	3.89	6.91	4.20	3.91	2.31	1.69	1.64	1.41	2.87	2.79	3.30
	MWRA Estimated Infiltration	0.40	0.44	0.40	0.72	0.43	0.40	0.24	0.17	0.17	0.15	0.30	0.29	0.34
	Final Average Daily Flow	6.18	6.35	6.25	9.92	6.86	6.58	4.67	4.09	3.94	4.12	5.19	5.05	5.75
	Final Dry Day Average Daily Flow	5.83	6.22	5.89	8.59	6.17	5.91	4.47	3.92	3.87	3.66	4.97	4.90	5.35
	Final Estimated Infiltration	3.43	3.82	3.49	6.19	3.77	3.51	2.07	1.52	1.47	1.26	2.57	2.50	2.95
	Estimated Sanitary Flow	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
	Estimated Inflow	0.35	0.13	0.36	1.33	0.69	0.67	0.20	0.17	0.07	0.46	0.22	0.15	0.40
Quincy	Average Daily Flow	14.37	14.63	13.52	20.61	14.30	14.53	11.83	10.60	9.56	10.25	11.17	10.58	12.97
	Dry Day Average Daily Flow	13.58	14.08	13.24	16.87	13.40	13.50	11.08	10.02	9.07	9.48	10.67	10.44	12.10
	Estimated Infiltration	5.38	5.88	5.04	8.67	5.20	5.30	2.88	1.82	0.87	1.28	2.47	2.24	3.90
	Estimated Sanitary Flow	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20
	Estimated Inflow	0.79	0.55	0.28	3.74	0.90	1.03	0.75	0.58	0.49	0.77	0.50	0.14	0.87
Randolph	Average Daily Flow	4.78	5.08	4.79	6.43	4.28	4.44	3.33	2.81	2.64	2.84	3.42	3.39	4.01
	Dry Day Average Daily Flow	4.68	4.59	4.75	5.25	3.95	4.19	3.21	2.68	2.61	2.62	3.24	3.26	3.74
	Estimated Infiltration	2.78	2.69	2.85	3.35	2.05	2.29	1.31	0.78	0.71	0.72	1.34	1.36	1.84
	Estimated Sanitary Flow	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
	Estimated Inflow	0.10	0.49	0.04	1.18	0.33	0.25	0.12	0.13	0.03	0.22	0.18	0.13	0.26
Stoughton	Average Daily Flow	3.23	3.45	3.37	4.92	3.66	3.35	2.49	2.00	1.85	2.03	2.51	2.53	2.94
	Dry Day Average Daily Flow	3.14	3.43	3.30	4.35	3.41	3.11	2.40	1.86	1.82	1.86	2.48	2.47	2.80
	Estimated Infiltration	1.74	2.03	1.90	2.95	2.01	1.71	1.00	0.46	0.42	0.46	1.08	1.07	1.40
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
	Estimated Inflow	0.09	0.02	0.07	0.57	0.25	0.24	0.09	0.14	0.03	0.17	0.03	0.06	0.15
Walpole	Average Daily Flow	2.23	2.19	2.25	3.06	2.59	2.27	1.68	1.55	1.54	1.73	1.87	1.81	2.06
	Dry Day Average Daily Flow	2.14	2.08	2.18	2.75	2.48	2.09	1.64	1.51	1.50	1.61	1.81	1.73	1.96
	Estimated Infiltration	0.94	0.88	0.98	1.55	1.28	0.89	0.44	0.31	0.30	0.41	0.61	0.53	0.76
	Estimated Sanitary Flow	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
	Estimated Inflow	0.09	0.11	0.07	0.31	0.11	0.18	0.04	0.04	0.04	0.12	0.06	0.08	0.10
Wellesley	Average Daily Flow	4.03	3.66	3.57	6.23	3.93	3.60	2.37	2.03	2.21	2.25	2.56	2.43	3.23
	Dry Day Average Daily Flow	3.87	3.52	3.36	4.98	3.69	3.20	2.28	1.94	2.13	2.09	2.50	2.36	2.99
	Estimated Infiltration	2.17	1.82	1.66	3.28	1.99	1.50	0.58	0.24	0.43	0.39	0.80	0.66	1.29
	Estimated Sanitary Flow	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
	Estimated Inflow	0.16	0.14	0.21	1.25	0.24	0.40	0.09	0.09	0.08	0.16	0.06	0.07	0.24
Westwood	Average Daily Flow	2.14	2.33	2.36	2.93	2.08	1.89	1.35	1.25	1.19	1.22	1.41	1.42	1.79
	Dry Day Average Daily Flow	2.10	2.25	2.24	2.47	1.97	1.73	1.32	1.19	1.11	1.17	1.37	1.35	1.68
	Estimated Infiltration	1.20	1.35	1.34	1.57	1.07	0.83	0.42	0.29	0.21	0.27	0.47	0.45	0.78
	Estimated Sanitary Flow	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
	Estimated Inflow	0.04	0.08	0.12	0.46	0.11	0.16	0.03	0.06	0.08	0.05	0.04	0.07	0.11

Table 4 - Estimated Community Wastewater Flow Components for 2017										2-May-18			PAGE 4	
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average (MGD)
Weymouth	Average Daily Flow	10.57	10.20	9.30	13.69	9.95	9.65	6.71	5.54	5.03	5.53	6.89	7.33	8.35
	Dry Day Average Daily Flow	10.01	9.57	9.25	11.41	9.14	8.65	6.44	5.26	4.86	4.95	6.80	7.25	7.78
	Estimated Infiltration	6.31	5.87	5.55	7.71	5.44	4.95	2.74	1.56	1.16	1.25	3.10	3.55	4.08
	Estimated Sanitary Flow	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
	Estimated Inflow	0.56	0.63	0.05	2.28	0.81	1.00	0.27	0.28	0.17	0.58	0.09	0.08	0.56
Subtotal (Southern System)	Raw Average Daily Flow	129.00	126.35	119.64	199.04	126.97	120.66	86.13	74.96	70.83	76.38	88.01	88.04	108.57
	Raw Dry Day Average Daily Flow	121.20	120.78	115.49	160.35	116.52	107.27	82.49	70.82	67.51	67.57	85.34	85.76	99.87
	Raw Estimated Infiltration	67.35	66.93	61.64	106.50	62.67	53.42	28.64	16.97	13.66	13.72	31.49	31.91	46.02
	MWRA Estimated Infiltration	6.03	6.44	5.35	12.08	5.88	4.96	3.19	2.23	1.84	1.73	3.18	3.51	4.68
	Final Average Daily Flow	122.97	119.91	114.29	186.96	121.09	115.70	82.94	72.73	68.99	74.65	84.83	84.53	103.89
	Final Dry Day Average Daily Flow	115.17	114.34	110.14	148.27	110.64	102.31	79.30	68.59	65.67	65.84	82.16	82.25	95.19
	Final Estimated Infiltration	61.32	60.49	56.29	94.42	56.79	48.46	25.45	14.74	11.82	11.99	28.31	28.40	41.34
	Estimated Sanitary Flow	53.85	53.85	53.85	53.85	53.85	53.85	53.85	53.85	53.85	53.85	53.85	53.85	53.85
	Estimated Inflow	7.80	5.57	4.15	38.69	10.45	13.39	3.64	4.14	3.32	8.81	2.67	2.28	8.71
South System Pump Station as Reported by NPDES	Average Daily Flow	133.10	128.70	121.80	190.80	129.10	122.40	89.90	75.70	71.30	77.40	89.50	89.30	109.67

Table 4 - Estimated Community Wastewater Flow Components for 2017														2-May-18 PAGE 5
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (MGD)
Arlington	Raw Average Daily Flow	5.95	5.84	5.80	9.51	5.97	5.06	4.11	3.02	2.89	3.05	3.84	3.70	4.88
	Raw Dry Day Average Daily Flow	5.79	5.61	5.51	7.45	5.50	4.51	3.70	2.83	2.70	2.72	3.73	3.58	4.46
	Raw Estimated Infiltration	3.29	3.11	3.01	4.95	3.00	2.01	1.20	0.33	0.20	0.22	1.23	1.08	1.96
	MWRA Estimated Infiltration	0.14	0.13	0.12	0.20	0.12	0.08	0.05	0.01	0.01	0.01	0.05	0.04	0.08
	Final Average Daily Flow	5.81	5.71	5.68	9.31	5.85	4.98	4.06	3.01	2.88	3.04	3.79	3.66	4.80
	Final Dry Day Average Daily Flow	5.65	5.48	5.39	7.25	5.38	4.43	3.65	2.82	2.69	2.71	3.68	3.54	4.38
	Final Estimated Infiltration	3.15	2.98	2.89	4.75	2.88	1.93	1.15	0.32	0.19	0.21	1.18	1.04	1.88
	Estimated Sanitary Flow	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
	Estimated Inflow	0.16	0.23	0.29	2.06	0.47	0.55	0.41	0.19	0.19	0.33	0.11	0.12	0.42
Bedford	Average Daily Flow	2.75	2.80	2.92	4.22	3.16	2.74	2.33	1.95	1.76	1.91	2.07	2.05	2.55
	Dry Day Average Daily Flow	2.69	2.63	2.80	3.69	2.99	2.53	2.19	1.84	1.65	1.85	2.05	1.98	2.40
	Estimated Infiltration	1.39	1.33	1.50	2.39	1.69	1.23	0.89	0.54	0.35	0.55	0.75	0.68	1.10
	Estimated Sanitary Flow	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
	Estimated Inflow	0.06	0.17	0.12	0.53	0.17	0.21	0.14	0.11	0.11	0.06	0.02	0.07	0.15
Belmont	Average Daily Flow	3.46	3.36	3.16	6.05	3.26	2.87	2.26	1.78	1.66	1.87	2.21	2.02	2.82
	Dry Day Average Daily Flow	3.17	3.05	2.92	4.16	2.90	2.49	2.03	1.69	1.56	1.52	2.11	1.91	2.45
	Estimated Infiltration	1.77	1.65	1.52	2.76	1.50	1.09	0.63	0.29	0.16	0.12	0.71	0.51	1.05
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
	Estimated Inflow	0.29	0.31	0.24	1.89	0.36	0.38	0.23	0.09	0.10	0.35	0.10	0.11	0.37
Boston (North Only)														
Boston Charlestown	Raw Average Daily Flow	3.55	3.15	3.09	4.32	3.48	3.58	3.18	2.53	3.30	3.48	2.61	2.85	3.26
	Raw Dry Day Average Daily Flow	2.73	2.80	2.44	2.51	2.84	3.51	2.60	2.34	3.01	2.96	2.40	2.31	2.70
	Raw Estimated Infiltration	1.03	1.10	0.74	0.81	1.14	1.81	0.90	0.64	1.31	1.26	0.70	0.61	1.00
	MWRA Estimated Infiltration	0.14	0.15	0.10	0.11	0.15	0.24	0.12	0.09	0.18	0.17	0.09	0.08	0.13
	Final Average Daily Flow	3.41	3.00	2.99	4.21	3.33	3.34	3.06	2.44	3.12	3.31	2.52	2.77	3.12
	Final Dry Day Average Daily Flow	2.59	2.65	2.34	2.40	2.69	3.27	2.48	2.25	2.83	2.79	2.31	2.23	2.57
	Final Estimated Infiltration	0.89	0.95	0.64	0.70	0.99	1.57	0.78	0.55	1.13	1.09	0.61	0.53	0.87
	Estimated Sanitary Flow	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
	Estimated Inflow	0.82	0.35	0.65	1.81	0.64	0.07	0.58	0.19	0.29	0.52	0.21	0.54	0.56
Boston Columbus Park	Raw Average Daily Flow	34.15	32.61	31.03	44.48	33.28	35.05	30.54	29.46	28.69	29.19	30.71	26.55	32.11
	Raw Dry Day Average Daily Flow	28.47	31.33	28.40	31.69	27.29	30.85	27.32	25.71	23.75	22.46	28.83	24.90	27.54
	Raw Estimated Infiltration	7.97	10.83	7.90	11.19	6.79	10.35	6.82	5.21	3.25	1.96	8.33	4.40	7.04
	MWRA Estimated Infiltration	0.22	0.30	0.22	0.31	0.19	0.29	0.19	0.15	0.09	0.05	0.23	0.12	0.20
	Final Average Daily Flow	33.93	32.31	30.81	44.17	33.09	34.76	30.35	29.31	28.60	29.14	30.48	26.43	31.92
	Final Dry Day Average Daily Flow	28.25	31.03	28.18	31.38	27.10	30.56	27.13	25.56	23.66	22.41	28.60	24.78	27.34
	Final Estimated Infiltration	7.75	10.53	7.68	10.88	6.60	10.06	6.63	5.06	3.16	1.91	8.10	4.28	6.84
	Estimated Sanitary Flow	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50
	Estimated Inflow	5.68	1.28	2.63	12.79	5.99	4.20	3.22	3.75	4.94	6.73	1.88	1.65	4.57
Boston East Boston	Raw Average Daily Flow	6.66	5.65	5.74	7.60	6.13	6.33	6.84	5.59	5.58	6.08	5.68	5.62	6.13
	Raw Dry Day Average Daily Flow	5.75	5.56	5.27	5.45	5.32	5.54	5.94	5.07	4.91	5.17	4.77	5.21	5.33
	Raw Estimated Infiltration	2.25	2.06	1.77	1.95	1.82	2.04	2.44	1.57	1.41	1.67	1.27	1.71	1.83
	MWRA Estimated Infiltration	0.34	0.31	0.27	0.30	0.28	0.31	0.37	0.24	0.21	0.25	0.19	0.26	0.28
	Final Average Daily Flow	6.32	5.34	5.47	7.30	5.85	6.02	6.47	5.35	5.37	5.83	5.49	5.36	5.85
	Final Dry Day Average Daily Flow	5.41	5.25	5.00	5.15	5.04	5.23	5.57	4.83	4.70	4.92	4.58	4.95	5.05
	Final Estimated Infiltration	1.91	1.75	1.50	1.65	1.54	1.73	2.07	1.33	1.20	1.42	1.08	1.45	1.55
	Estimated Sanitary Flow	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	Estimated Inflow	0.91	0.09	0.47	2.15	0.81	0.79	0.90	0.52	0.67	0.91	0.91	0.41	0.80

Table 4 - Estimated Community Wastewater Flow Components for 2017														2-May-18 PAGE 6 Annual Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Boston Ward Street	Raw Average Daily Flow	33.93	33.92	33.62	41.35	32.00	32.87	30.12	27.97	31.31	33.53	27.00	27.59	32.07
	Raw Dry Day Average Daily Flow	31.61	32.43	31.55	34.98	29.68	30.53	27.84	27.37	28.08	31.86	25.71	26.81	29.85
	Raw Estimated Infiltration	7.11	7.93	7.05	10.48	5.18	6.03	3.34	2.87	3.58	7.36	1.21	2.31	5.35
	MWRA Estimated Infiltration	1.22	1.36	1.21	1.79	0.89	1.03	0.57	0.49	0.61	1.26	0.21	0.39	0.92
	Final Average Daily Flow	32.71	32.56	32.41	39.56	31.11	31.84	29.55	27.48	30.70	32.27	26.79	27.20	31.16
	Final Dry Day Average Daily Flow	30.39	31.07	30.34	33.19	28.79	29.50	27.27	26.88	27.47	30.60	25.50	26.42	28.93
	Final Estimated Infiltration	5.89	6.57	5.84	8.69	4.29	5.00	2.77	2.38	2.97	6.10	1.00	1.92	4.43
	Estimated Sanitary Flow	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50
	Estimated Inflow	2.32	1.49	2.07	6.37	2.32	2.34	2.28	0.60	3.23	1.67	1.29	0.78	2.22
Boston (North Total)	Raw Average Daily Flow	78.29	75.33	73.48	97.75	74.89	77.83	70.68	65.55	68.88	72.28	66.00	62.61	73.57
	Raw Dry Day Average Daily Flow	68.56	72.12	67.66	74.63	65.13	70.43	63.70	60.49	59.75	62.45	61.71	59.23	65.42
	Raw Estimated Infiltration	18.36	21.92	17.46	24.43	14.93	20.23	13.50	10.29	9.55	12.25	11.51	9.03	15.22
	MWRA Estimated Infiltration	1.92	2.12	1.80	2.51	1.51	1.87	1.25	0.97	1.09	1.73	0.72	0.85	1.52
	Final Average Daily Flow	76.37	73.21	71.68	95.24	73.38	75.96	69.43	64.58	67.79	70.55	65.28	61.76	72.05
	Final Dry Day Average Daily Flow	66.64	70.00	65.86	72.12	63.62	68.56	62.45	59.52	58.66	60.72	60.99	58.38	63.90
	Final Estimated Infiltration	16.44	19.80	15.66	21.92	13.42	18.36	12.25	9.32	8.46	10.52	10.79	8.18	13.70
	Estimated Sanitary Flow	50.20	50.20	50.20	50.20	50.20	50.20	50.20	50.20	50.20	50.20	50.20	50.20	50.20
	Estimated Inflow	9.73	3.21	5.82	23.12	9.76	7.40	6.98	5.06	9.13	9.83	4.29	3.38	8.15
Brookline (North Only)	Average Daily Flow	2.84	2.85	2.72	3.95	3.06	3.08	2.73	2.53	2.52	2.62	2.46	2.32	2.80
	Dry Day Average Daily Flow	2.55	2.67	2.63	3.33	2.83	2.82	2.55	2.39	2.39	2.38	2.44	2.26	2.60
	Estimated Infiltration	0.45	0.57	0.53	1.23	0.73	0.72	0.45	0.29	0.29	0.28	0.34	0.16	0.50
	Estimated Sanitary Flow	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
	Estimated Inflow	0.29	0.18	0.09	0.62	0.23	0.26	0.18	0.14	0.13	0.24	0.02	0.06	0.20
Burlington	Average Daily Flow	3.96	3.97	4.01	5.72	4.38	3.94	3.11	2.62	2.46	2.40	2.80	2.86	3.51
	Dry Day Average Daily Flow	3.88	3.81	3.91	4.99	4.16	3.75	3.06	2.50	2.38	2.34	2.79	2.81	3.36
	Estimated Infiltration	1.88	1.81	1.91	2.99	2.16	1.75	1.06	0.50	0.38	0.34	0.79	0.81	1.36
	Estimated Sanitary Flow	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	Estimated Inflow	0.08	0.16	0.10	0.73	0.22	0.19	0.05	0.12	0.08	0.06	0.01	0.05	0.15
Cambridge	Raw Average Daily Flow	18.89	17.69	17.42	25.18	21.59	20.98	18.58	15.91	16.19	17.12	15.77	14.12	18.28
	Raw Dry Day Average Daily Flow	15.57	15.99	15.73	18.37	18.79	17.53	15.96	15.28	14.50	13.66	14.77	12.94	15.75
	Raw Estimated Infiltration	4.07	4.49	4.23	6.87	7.29	6.03	4.46	3.78	3.00	2.16	3.27	1.44	4.25
	MWRA Estimated Infiltration	0.57	0.63	0.59	0.97	1.02	0.85	0.63	0.53	0.42	0.30	0.46	0.20	0.60
	Final Average Daily Flow	18.32	17.06	16.83	24.21	20.57	20.13	17.95	15.38	15.77	16.82	15.31	13.92	17.68
	Final Dry Day Average Daily Flow	15.00	15.36	15.14	17.40	17.77	16.68	15.33	14.75	14.08	13.36	14.31	12.74	15.15
	Final Estimated Infiltration	3.50	3.86	3.64	5.90	6.27	5.18	3.83	3.25	2.58	1.86	2.81	1.24	3.65
	Estimated Sanitary Flow	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50
	Estimated Inflow	3.32	1.70	1.69	6.81	2.80	3.45	2.62	0.63	1.69	3.46	1.00	1.18	2.53
Chelsea	Raw Average Daily Flow	6.04	5.73	5.52	7.73	5.51	5.77	5.35	4.18	4.66	5.03	4.85	4.71	5.42
	Raw Dry Day Average Daily Flow	4.68	5.35	4.76	4.85	4.41	4.71	4.05	3.89	3.88	3.92	4.38	4.08	4.41
	Raw Estimated Infiltration	1.68	2.35	1.76	1.85	1.41	1.71	1.05	0.89	0.88	0.92	1.38	1.08	1.41
	MWRA Estimated Infiltration	0.21	0.29	0.22	0.23	0.17	0.21	0.13	0.11	0.11	0.11	0.17	0.13	0.17
	Final Average Daily Flow	5.83	5.44	5.30	7.50	5.34	5.56	5.22	4.07	4.55	4.92	4.68	4.58	5.24
	Final Dry Day Average Daily Flow	4.47	5.06	4.54	4.62	4.24	4.50	3.92	3.78	3.77	3.81	4.21	3.95	4.23
	Final Estimated Infiltration	1.47	2.06	1.54	1.62	1.24	1.50	0.92	0.78	0.77	0.81	1.21	0.95	1.23
	Estimated Sanitary Flow	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	Estimated Inflow	1.36	0.38	0.76	2.88	1.10	1.06	1.30	0.29	0.78	1.11	0.47	0.63	1.01

Table 4 - Estimated Community Wastewater Flow Components for 2017											2-May-18		PAGE 7	Average
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(MGD)
Everett	Raw Average Daily Flow	6.08	6.01	5.74	8.21	6.03	5.89	5.40	4.81	4.86	5.19	4.95	4.84	5.66
	Raw Dry Day Average Daily Flow	5.66	5.65	5.48	6.52	5.53	5.38	4.78	4.51	4.49	4.61	4.77	4.77	5.17
	Raw Estimated Infiltration	2.46	2.45	2.28	3.32	2.33	2.18	1.58	1.31	1.29	1.41	1.57	1.57	1.97
	MWRA Estimated Infiltration	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Final Average Daily Flow	6.07	6.00	5.73	8.19	6.02	5.88	5.39	4.80	4.85	5.18	4.94	4.83	5.65
	Final Dry Day Average Daily Flow	5.65	5.64	5.47	6.50	5.52	5.37	4.77	4.50	4.48	4.60	4.76	4.76	5.16
	Final Estimated Infiltration	2.45	2.44	2.27	3.30	2.32	2.17	1.57	1.30	1.28	1.40	1.56	1.56	1.96
	Estimated Sanitary Flow	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
	Estimated Inflow	0.42	0.36	0.26	1.69	0.50	0.51	0.62	0.30	0.37	0.58	0.18	0.07	0.49
Lexington	Raw Average Daily Flow	6.06	6.12	6.24	9.89	6.91	5.93	4.87	3.54	3.12	2.66	3.70	3.85	5.23
	Raw Dry Day Average Daily Flow	5.86	5.68	5.97	8.81	6.51	5.59	4.28	3.36	2.97	2.51	3.61	3.84	4.91
	Raw Estimated Infiltration	3.66	3.48	3.77	6.61	4.31	3.39	2.08	1.16	0.77	0.31	1.41	1.64	2.71
	MWRA Estimated Infiltration	0.35	0.33	0.36	0.62	0.41	0.32	0.20	0.11	0.07	0.03	0.13	0.15	0.26
	Final Average Daily Flow	5.71	5.79	5.88	9.27	6.50	5.61	4.67	3.43	3.05	2.63	3.57	3.70	4.97
	Final Dry Day Average Daily Flow	5.51	5.35	5.61	8.19	6.10	5.27	4.08	3.25	2.90	2.48	3.48	3.69	4.65
	Final Estimated Infiltration	3.31	3.15	3.41	5.99	3.90	3.07	1.88	1.05	0.70	0.28	1.28	1.49	2.45
	Estimated Sanitary Flow	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
	Estimated Inflow	0.20	0.44	0.27	1.08	0.40	0.34	0.59	0.18	0.15	0.15	0.09	0.01	0.32
Malden	Raw Average Daily Flow	11.00	10.72	9.77	13.91	10.30	9.04	7.63	6.60	6.34	6.93	7.87	7.66	8.96
	Raw Dry Day Average Daily Flow	10.24	9.94	9.58	11.32	9.69	8.42	7.31	6.30	6.08	6.26	7.67	7.51	8.35
	Raw Estimated Infiltration	5.34	5.04	4.68	6.42	4.79	3.52	2.41	1.40	1.18	1.36	2.77	2.61	3.45
	MWRA Estimated Infiltration	0.50	0.47	0.44	0.60	0.45	0.33	0.23	0.13	0.11	0.13	0.26	0.25	0.32
	Final Average Daily Flow	10.50	10.25	9.33	13.31	9.85	8.71	7.40	6.47	6.23	6.80	7.61	7.41	8.64
	Final Dry Day Average Daily Flow	9.74	9.47	9.14	10.72	9.24	8.09	7.08	6.17	5.97	6.13	7.41	7.26	8.02
	Final Estimated Infiltration	4.84	4.57	4.24	5.82	4.34	3.19	2.18	1.27	1.07	1.23	2.51	2.36	3.12
	Estimated Sanitary Flow	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90
	Estimated Inflow	0.76	0.78	0.19	2.59	0.61	0.62	0.32	0.30	0.26	0.67	0.20	0.15	0.62
Medford	Raw Average Daily Flow	10.00	9.36	9.00	14.79	8.82	8.22	6.75	5.30	5.27	5.53	6.50	6.19	7.96
	Raw Dry Day Average Daily Flow	9.02	8.37	8.51	11.64	7.93	7.37	5.98	5.00	4.76	4.75	6.27	6.03	7.12
	Raw Estimated Infiltration	4.82	4.17	4.31	7.44	3.73	3.17	1.78	0.80	0.56	0.55	2.07	1.83	2.92
	MWRA Estimated Infiltration	0.56	0.48	0.50	0.86	0.43	0.37	0.21	0.09	0.06	0.06	0.24	0.21	0.34
	Final Average Daily Flow	9.44	8.88	8.50	13.93	8.39	7.85	6.54	5.21	5.21	5.47	6.26	5.98	7.62
	Final Dry Day Average Daily Flow	8.46	7.89	8.01	10.78	7.50	7.00	5.77	4.91	4.70	4.69	6.03	5.82	6.78
	Final Estimated Infiltration	4.26	3.69	3.81	6.58	3.30	2.80	1.57	0.71	0.50	0.49	1.83	1.62	2.58
	Estimated Sanitary Flow	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
	Estimated Inflow	0.98	0.99	0.49	3.15	0.89	0.85	0.77	0.30	0.51	0.78	0.23	0.16	0.84
Melrose	Raw Average Daily Flow	6.75	6.20	5.66	9.95	5.82	5.09	3.47	2.87	2.63	2.84	3.53	3.27	4.82
	Raw Dry Day Average Daily Flow	6.23	5.18	5.25	7.60	5.45	4.74	3.28	2.67	2.50	2.54	3.36	3.21	4.32
	Raw Estimated Infiltration	4.43	3.38	3.45	5.80	3.65	2.94	1.48	0.87	0.70	0.74	1.56	1.41	2.52
	MWRA Estimated Infiltration	0.86	0.65	0.67	1.12	0.71	0.57	0.29	0.17	0.14	0.14	0.30	0.27	0.49
	Final Average Daily Flow	5.89	5.55	4.99	8.83	5.11	4.52	3.18	2.70	2.49	2.70	3.23	3.00	4.33
	Final Dry Day Average Daily Flow	5.37	4.53	4.58	6.48	4.74	4.17	2.99	2.50	2.36	2.40	3.06	2.94	3.84
	Final Estimated Infiltration	3.57	2.73	2.78	4.68	2.94	2.37	1.19	0.70	0.56	0.60	1.26	1.14	2.04
	Estimated Sanitary Flow	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
	Estimated Inflow	0.52	1.02	0.41	2.35	0.37	0.35	0.19	0.20	0.13	0.30	0.17	0.06	0.50

Table 4 - Estimated Community Wastewater Flow Components for 2017														2-May-18 PAGE 8
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (MGD)
Milton (North Only)	Average Daily Flow	0.29	0.31	0.29	0.58	0.34	0.29	0.20	0.19	0.20	0.22	0.24	0.24	0.28
	Dry Day Average Daily Flow	0.27	0.30	0.28	0.47	0.33	0.26	0.19	0.18	0.19	0.21	0.23	0.23	0.26
	Estimated Infiltration	0.12	0.15	0.13	0.32	0.18	0.11	0.04	0.03	0.04	0.06	0.08	0.08	0.11
	Estimated Sanitary Flow	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
	Estimated Inflow	0.02	0.01	0.01	0.11	0.01	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Newton (North Only)	Average Daily Flow	7.01	6.86	6.63	11.43	6.87	6.22	4.76	4.03	3.84	3.82	4.40	4.26	5.83
	Dry Day Average Daily Flow	6.70	6.46	6.36	9.82	6.50	5.74	4.55	3.80	3.70	3.74	4.34	4.22	5.48
	Estimated Infiltration	3.00	2.76	2.66	6.12	2.80	2.04	0.85	0.10	0.00	0.04	0.64	0.52	1.78
	Estimated Sanitary Flow	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
	Estimated Inflow	0.31	0.40	0.27	1.61	0.37	0.48	0.21	0.23	0.14	0.08	0.06	0.04	0.35
Reading	Raw Average Daily Flow	3.74	3.66	3.62	5.48	3.78	3.27	2.33	1.90	1.74	1.71	2.14	2.22	2.96
	Raw Dry Day Average Daily Flow	3.58	3.39	3.46	4.80	3.58	3.01	2.24	1.69	1.62	1.60	2.10	2.16	2.76
	Raw Estimated Infiltration	2.28	2.09	2.16	3.50	2.28	1.71	0.94	0.39	0.32	0.30	0.80	0.86	1.46
	MWRA Estimated Infiltration	0.02	0.02	0.02	0.03	0.02	0.02	0.01	0.00	0.00	0.00	0.01	0.01	0.01
	Final Average Daily Flow	3.72	3.64	3.60	5.45	3.76	3.25	2.32	1.90	1.74	1.71	2.13	2.21	2.94
	Final Dry Day Average Daily Flow	3.56	3.37	3.44	4.77	3.56	2.99	2.23	1.69	1.62	1.60	2.09	2.15	2.75
	Final Estimated Infiltration	2.26	2.07	2.14	3.47	2.26	1.69	0.93	0.39	0.32	0.30	0.79	0.85	1.45
	Estimated Sanitary Flow	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
	Estimated Inflow	0.16	0.27	0.16	0.68	0.20	0.26	0.09	0.21	0.12	0.11	0.04	0.06	0.20
Revere	Raw Average Daily Flow	7.31	6.90	5.93	9.79	6.88	6.74	5.88	4.26	4.41	5.20	5.41	5.23	6.15
	Raw Dry Day Average Daily Flow	6.19	6.51	5.68	7.15	6.17	5.91	5.04	3.94	3.86	4.56	5.27	4.77	5.41
	Raw Estimated Infiltration	2.69	3.01	2.18	3.65	2.67	2.41	1.54	0.44	0.36	1.06	1.77	1.27	1.91
	MWRA Estimated Infiltration	0.02	0.02	0.02	0.03	0.02	0.02	0.01	0.00	0.00	0.01	0.01	0.01	0.01
	Final Average Daily Flow	7.29	6.88	5.91	9.76	6.86	6.72	5.87	4.26	4.41	5.19	5.40	5.22	6.14
	Final Dry Day Average Daily Flow	6.17	6.49	5.66	7.12	6.15	5.89	5.03	3.94	3.86	4.55	5.26	4.76	5.40
	Final Estimated Infiltration	2.67	2.99	2.16	3.62	2.65	2.39	1.53	0.44	0.36	1.05	1.76	1.26	1.90
	Estimated Sanitary Flow	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	Estimated Inflow	1.12	0.39	0.25	2.64	0.71	0.83	0.84	0.32	0.55	0.64	0.14	0.46	0.74
Somerville	Raw Average Daily Flow	12.20	11.18	10.47	17.63	11.53	11.16	9.49	6.78	7.77	9.67	8.48	8.13	10.36
	Raw Dry Day Average Daily Flow	9.17	10.24	8.49	10.01	7.21	8.23	6.59	6.41	6.38	6.41	7.68	6.92	7.79
	Raw Estimated Infiltration	3.67	4.74	2.99	4.51	1.71	2.73	1.09	0.91	0.88	0.91	2.18	1.42	2.29
	MWRA Estimated Infiltration	0.08	0.11	0.07	0.10	0.04	0.06	0.02	0.02	0.02	0.02	0.05	0.03	0.05
	Final Average Daily Flow	12.12	11.07	10.40	17.53	11.49	11.10	9.47	6.76	7.75	9.65	8.43	8.10	10.31
	Final Dry Day Average Daily Flow	9.09	10.13	8.42	9.91	7.17	8.17	6.57	6.39	6.36	6.39	7.63	6.89	7.74
	Final Estimated Infiltration	3.59	4.63	2.92	4.41	1.67	2.67	1.07	0.89	0.86	0.89	2.13	1.39	2.24
	Estimated Sanitary Flow	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	Estimated Inflow	3.03	0.94	1.98	7.62	4.32	2.93	2.90	0.37	1.39	3.26	0.80	1.21	2.57
Stoneham	Raw Average Daily Flow	3.94	3.76	3.71	5.64	4.15	3.28	1.93	1.68	1.72	1.93	2.50	2.51	3.05
	Raw Dry Day Average Daily Flow	3.86	3.52	3.60	5.05	3.86	2.89	1.86	1.65	1.66	1.82	2.42	2.39	2.88
	Raw Estimated Infiltration	2.46	2.12	2.20	3.65	2.46	1.49	0.46	0.25	0.26	0.42	1.02	0.99	1.48
	MWRA Estimated Infiltration	0.41	0.35	0.36	0.60	0.41	0.25	0.08	0.04	0.04	0.07	0.17	0.16	0.24
	Final Average Daily Flow	3.53	3.41	3.35	5.04	3.74	3.03	1.85	1.64	1.68	1.86	2.33	2.35	2.81
	Final Dry Day Average Daily Flow	3.45	3.17	3.24	4.45	3.45	2.64	1.78	1.61	1.62	1.75	2.25	2.23	2.63
	Final Estimated Infiltration	2.05	1.77	1.84	3.05	2.05	1.24	0.38	0.21	0.22	0.35	0.85	0.83	1.23
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
	Estimated Inflow	0.08	0.24	0.11	0.59	0.29	0.39	0.07	0.03	0.06	0.11	0.08	0.12	0.18

Table 4 - Estimated Community Wastewater Flow Components for 2017											2-May-18		PAGE 9	Annual Average
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(MGD)
Wakefield	Raw Average Daily Flow	5.21	5.13	5.08	8.28	5.57	4.48	3.21	2.58	2.28	2.26	2.73	2.88	4.13
	Raw Dry Day Average Daily Flow	5.01	4.53	4.86	7.15	5.20	4.01	3.08	2.41	2.18	2.12	2.71	2.81	3.83
	Raw Estimated Infiltration	3.51	3.03	3.36	5.65	3.70	2.51	1.58	0.91	0.68	0.62	1.21	1.31	2.33
	MWRA Estimated Infiltration	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01
	Final Average Daily Flow	5.20	5.12	5.07	8.26	5.56	4.47	3.20	2.58	2.28	2.26	2.73	2.87	4.12
	Final Dry Day Average Daily Flow	5.00	4.52	4.85	7.13	5.19	4.00	3.07	2.41	2.18	2.12	2.71	2.80	3.82
	Final Estimated Infiltration	3.50	3.02	3.35	5.63	3.69	2.50	1.57	0.91	0.68	0.62	1.21	1.30	2.32
	Estimated Sanitary Flow	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
	Estimated Inflow	0.20	0.60	0.22	1.13	0.37	0.47	0.13	0.17	0.10	0.14	0.02	0.07	0.30
Waltham	Raw Average Daily Flow	10.38	9.98	9.64	13.50	10.72	9.73	8.46	7.07	6.62	6.71	7.42	7.12	8.93
	Raw Dry Day Average Daily Flow	10.03	9.34	9.27	12.73	10.08	9.36	7.81	6.82	6.34	6.13	7.34	6.94	8.50
	Raw Estimated Infiltration	4.43	3.74	3.67	7.13	4.48	3.76	2.21	1.22	0.74	0.53	1.74	1.34	2.90
	MWRA Estimated Infiltration	0.20	0.17	0.17	0.32	0.20	0.17	0.10	0.05	0.03	0.02	0.08	0.06	0.13
	Final Average Daily Flow	10.18	9.81	9.47	13.18	10.52	9.56	8.36	7.02	6.59	6.69	7.34	7.06	8.80
	Final Dry Day Average Daily Flow	9.83	9.17	9.10	12.41	9.88	9.19	7.71	6.77	6.31	6.11	7.26	6.88	8.37
	Final Estimated Infiltration	4.23	3.57	3.50	6.81	4.28	3.59	2.11	1.17	0.71	0.51	1.66	1.28	2.77
	Estimated Sanitary Flow	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60
	Estimated Inflow	0.35	0.64	0.37	0.77	0.64	0.37	0.65	0.25	0.28	0.58	0.08	0.18	0.43
Watertown	Average Daily Flow	4.14	4.10	3.89	5.82	4.09	3.78	2.93	2.52	2.45	2.51	2.80	2.71	3.47
	Dry Day Average Daily Flow	3.93	3.69	3.75	4.80	3.78	3.39	2.74	2.44	2.32	2.28	2.73	2.64	3.20
	Estimated Infiltration	1.73	1.49	1.55	2.60	1.58	1.19	0.54	0.24	0.12	0.08	0.53	0.44	1.00
	Estimated Sanitary Flow	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
	Estimated Inflow	0.21	0.41	0.14	1.02	0.31	0.39	0.19	0.08	0.13	0.23	0.07	0.07	0.27
Wilmington	Raw Average Daily Flow	1.52	1.51	1.53	1.95	1.65	1.59	1.27	1.22	1.23	1.26	1.33	1.36	1.45
	Raw Dry Day Average Daily Flow	1.50	1.49	1.51	1.80	1.56	1.57	1.19	1.15	1.21	1.24	1.30	1.32	1.40
	Raw Estimated Infiltration	0.70	0.69	0.71	1.00	0.76	0.77	0.39	0.35	0.41	0.44	0.50	0.52	0.60
	MWRA Estimated Infiltration	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.01
	Final Average Daily Flow	1.51	1.50	1.52	1.94	1.64	1.58	1.27	1.22	1.23	1.26	1.32	1.35	1.44
	Final Dry Day Average Daily Flow	1.49	1.48	1.50	1.79	1.55	1.56	1.19	1.15	1.21	1.24	1.29	1.31	1.40
	Final Estimated Infiltration	0.69	0.68	0.70	0.99	0.75	0.76	0.39	0.35	0.41	0.44	0.49	0.51	0.60
	Estimated Sanitary Flow	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	Estimated Inflow	0.02	0.02	0.02	0.15	0.09	0.02	0.08	0.07	0.02	0.02	0.03	0.04	0.05
Winchester	Average Daily Flow	3.00	2.89	2.75	4.62	3.15	2.56	1.76	1.41	1.34	1.40	1.66	1.64	2.34
	Dry Day Average Daily Flow	2.88	2.69	2.58	3.78	3.02	2.23	1.61	1.34	1.28	1.31	1.63	1.61	2.16
	Estimated Infiltration	1.78	1.59	1.48	2.68	1.92	1.13	0.51	0.24	0.18	0.21	0.53	0.51	1.06
	Estimated Sanitary Flow	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
	Estimated Inflow	0.12	0.20	0.17	0.84	0.13	0.33	0.15	0.07	0.06	0.09	0.03	0.03	0.18
Winthrop	Average Daily Flow	2.58	2.49	2.31	3.37	2.31	2.41	1.98	1.59	1.65	1.78	1.79	1.83	2.17
	Dry Day Average Daily Flow	2.21	2.43	2.16	2.61	2.11	2.16	1.79	1.50	1.43	1.56	1.68	1.76	1.95
	Estimated Infiltration	1.11	1.33	1.06	1.51	1.01	1.06	0.69	0.40	0.33	0.46	0.58	0.66	0.85
	Estimated Sanitary Flow	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
	Estimated Inflow	0.37	0.06	0.15	0.76	0.20	0.25	0.19	0.09	0.22	0.22	0.11	0.07	0.22

Table 4 - Estimated Community Wastewater Flow Components for 2017											2-May-18		PAGE 10	Annual Average
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(MGD)
Woburn	Raw Average Daily Flow	7.75	7.44	7.45	11.57	7.69	7.19	6.05	5.35	5.23	5.32	6.16	5.77	6.90
	Raw Dry Day Average Daily Flow	7.16	7.15	7.09	9.37	7.33	6.99	5.61	5.25	5.04	4.86	6.13	5.70	6.46
	Raw Estimated Infiltration	3.46	3.45	3.39	5.67	3.63	3.29	1.91	1.55	1.34	1.16	2.43	2.00	2.76
	MWRA Estimated Infiltration	0.49	0.49	0.48	0.80	0.51	0.46	0.27	0.22	0.19	0.16	0.34	0.28	0.39
	Final Average Daily Flow	7.26	6.95	6.97	10.77	7.18	6.73	5.78	5.13	5.04	5.16	5.82	5.49	6.51
	Final Dry Day Average Daily Flow	6.67	6.66	6.61	8.57	6.82	6.53	5.34	5.03	4.85	4.70	5.79	5.42	6.07
	Final Estimated Infiltration	2.97	2.96	2.91	4.87	3.12	2.83	1.64	1.33	1.15	1.00	2.09	1.72	2.37
	Estimated Sanitary Flow	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
	Estimated Inflow	0.59	0.29	0.36	2.20	0.36	0.20	0.44	0.10	0.19	0.46	0.03	0.07	0.44
Subtotal (Northern System)	Raw Average Daily Flow	231.14	222.19	214.74	316.52	228.43	219.14	187.52	161.24	163.72	173.22	173.61	166.10	204.51
	Raw Dry Day Average Daily Flow	206.39	207.79	199.80	246.90	202.55	196.02	167.17	151.33	146.82	149.35	165.22	157.62	182.81
	Raw Estimated Infiltration	84.54	85.94	77.95	125.05	80.70	74.17	45.32	29.48	24.97	27.50	43.37	35.77	60.96
	MWRA Estimated Infiltration	6.36	6.29	5.85	9.04	6.05	5.61	3.50	2.46	2.30	2.80	3.01	2.68	4.65
	Final Average Daily Flow	224.78	215.90	208.89	307.48	222.38	213.53	184.02	158.78	161.42	170.42	170.60	163.42	199.86
	Final Dry Day Average Daily Flow	200.03	201.50	193.95	237.86	196.50	190.41	163.67	148.87	144.52	146.55	162.21	154.94	178.17
	Final Estimated Infiltration	78.18	79.65	72.10	116.01	74.65	68.56	41.82	27.02	22.67	24.70	40.36	33.09	56.32
	Estimated Sanitary Flow	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85
	Estimated Inflow	24.75	14.40	14.94	69.62	25.88	23.12	20.35	9.91	16.90	23.87	8.39	8.48	21.69
Total (North and South)	Raw Average Daily Flow	360.14	348.54	334.38	515.56	355.40	339.80	273.65	236.20	234.55	249.60	261.62	254.14	313.08
	Raw Dry Day Average Daily Flow	327.59	328.57	315.29	407.25	319.07	303.29	249.66	222.15	214.33	216.92	250.56	243.38	282.68
	Raw Estimated Infiltration	151.89	152.87	139.59	231.55	143.37	127.59	73.96	46.45	38.63	41.22	74.86	67.68	106.98
	MWRA Estimated Infiltration	12.39	12.73	11.20	21.12	11.93	10.57	6.69	4.69	4.14	4.53	6.19	6.19	9.32
	Final Average Daily Flow	347.75	335.81	323.18	494.44	343.47	329.23	266.96	231.51	230.41	245.07	255.43	247.95	303.75
	Final Dry Day Average Daily Flow	315.20	315.84	304.09	386.13	307.14	292.72	242.97	217.46	210.19	212.39	244.37	237.19	273.36
	Final Estimated Infiltration	139.50	140.14	128.39	210.43	131.44	117.02	67.27	41.76	34.49	36.69	68.67	61.49	97.66
	Estimated Sanitary Flow	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70
	Estimated Inflow	32.55	19.97	19.09	108.31	36.33	36.51	23.99	14.05	20.22	32.68	11.06	10.76	30.40
North System as Reported by NPDES	Average Daily Flow	240.20	232.10	228.00	328.70	236.90	229.30	198.90	169.80	171.40	183.40	181.20	171.70	214.01
Total System as Reported by NPDES	Average Daily Flow	373.30	360.80	349.80	519.50	366.00	351.70	288.80	245.50	242.70	260.80	270.70	261.00	323.68

Table 4 - Estimated Community Wastewater Flow Components for 2017														2-May-18 PAGE 11
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (MGD)
Chelsea Creek	Average Daily Flow	113.44	109.64	105.97	168.08	114.43	105.97	88.10	70.46	71.04	79.32	82.21	78.56	98.76
	Dry Day Average Daily Flow	102.21	98.44	99.13	135.09	101.42	94.80	77.84	65.55	63.52	66.53	78.01	75.29	88.02
	Estimated Infiltration	55.31	51.54	52.23	88.19	54.52	47.90	30.94	18.65	16.62	19.63	31.11	28.39	41.12
	Estimated Sanitary Flow	46.90	46.90	46.90	46.90	46.90	46.90	46.90	46.90	46.90	46.90	46.90	46.90	46.90
	Estimated Inflow	11.23	11.20	6.84	32.99	13.01	11.17	10.26	4.91	7.52	12.79	4.20	3.27	10.74
Columbus Park	Average Daily Flow	35.06	33.36	31.74	46.21	34.15	36.10	31.14	30.02	29.36	29.96	27.48	27.17	32.62
	Dry Day Average Daily Flow	29.08	32.06	28.90	32.66	27.77	31.36	27.67	25.99	24.04	22.76	26.11	25.41	27.77
	Estimated Infiltration	8.43	11.41	8.25	12.01	7.12	10.71	7.02	5.34	3.39	2.11	5.46	4.76	7.12
	Estimated Sanitary Flow	20.65	20.65	20.65	20.65	20.65	20.65	20.65	20.65	20.65	20.65	20.65	20.65	20.65
	Estimated Inflow	5.98	1.30	2.84	13.55	6.38	4.74	3.47	4.03	5.32	7.20	1.37	1.76	4.84
Ward Street	Average Daily Flow	69.70	68.03	66.94	93.79	70.70	69.54	61.15	54.90	56.58	59.57	57.30	52.93	65.02
	Dry Day Average Daily Flow	64.94	65.60	63.11	77.70	65.88	63.86	56.32	54.26	52.19	55.18	54.78	51.28	60.36
	Estimated Infiltration	20.44	21.10	18.61	33.20	21.38	19.36	11.82	9.76	7.69	10.68	10.28	6.78	15.86
	Estimated Sanitary Flow	44.50	44.50	44.50	44.50	44.50	44.50	44.50	44.50	44.50	44.50	44.50	44.50	44.50
	Estimated Inflow	4.76	2.43	3.83	16.09	4.82	5.68	4.83	0.64	4.39	4.39	2.52	1.65	4.66
Winthrop Terminal	Average Daily Flow	22.68	21.40	18.87	26.88	18.85	19.01	19.80	16.47	16.86	18.86	17.87	16.74	19.50
	Dry Day Average Daily Flow	20.55	20.93	17.08	18.09	16.76	15.75	16.66	14.73	13.97	15.80	17.04	14.74	16.81
	Estimated Infiltration	10.75	11.13	7.28	8.29	6.96	5.95	6.86	4.93	4.17	6.00	7.24	4.94	7.01
	Estimated Sanitary Flow	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80
	Estimated Inflow	2.13	0.47	1.79	8.79	2.09	3.26	3.14	1.74	2.89	3.06	0.83	2.00	2.69
Subtotal - Northern Headworks	Average Daily Flow	240.88	232.43	223.52	334.96	238.13	230.62	200.19	171.85	173.84	187.71	184.86	175.40	215.90
	Dry Day Average Daily Flow	216.78	217.03	208.22	263.54	211.83	205.77	178.49	160.53	153.72	160.27	175.94	166.72	192.97
	Estimated Infiltration	94.93	95.18	86.37	141.69	89.98	83.92	56.64	38.68	31.87	38.42	54.09	44.87	71.12
	Estimated Sanitary Flow	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85
	Estimated Inflow	24.10	15.40	15.30	71.42	26.30	24.85	21.70	11.32	20.12	27.44	8.92	8.68	22.93
Headworks as Reported by NPDES	SUM of ADF's	240.20	232.10	228.00	328.70	236.90	229.30	198.90	169.80	171.40	183.40	181.20	171.70	214.01
Chelsea Creek	Average Daily Flow	113.00	109.40	107.40	165.40	113.40	104.90	86.90	68.80	68.90	75.10	78.70	75.20	97.08
Columbus Park	Average Daily Flow	35.10	33.50	33.30	44.80	34.20	36.20	31.30	30.00	29.40	30.10	27.60	27.30	32.71
Ward Street	Average Daily Flow	69.50	67.80	68.00	92.00	70.50	69.20	60.90	54.60	56.30	59.40	57.00	52.50	64.74
Winthrop Terminal	Average Daily Flow	22.60	21.40	19.30	26.50	18.80	19.00	19.80	16.40	16.80	18.80	17.90	16.70	19.48
Total System Flow (Southern Collection System Plus Northern Headworks)	Raw Average Daily Flow	369.88	358.78	343.16	534.00	365.10	351.28	286.32	246.81	244.67	264.09	272.87	263.44	324.47
	Raw Dry Day Average Daily Flow	337.98	337.81	323.71	423.89	328.35	313.04	260.98	231.35	221.23	227.84	261.28	252.48	292.84
	Raw Estimated Infiltration	162.28	162.11	148.01	248.19	152.65	137.34	85.28	55.65	45.53	52.14	85.58	76.78	117.14
	MWRA Estimated Infiltration	6.03	6.44	5.35	12.08	5.88	4.96	3.19	2.23	1.84	1.73	3.18	3.51	4.68
	Final Average Daily Flow	363.85	352.34	337.81	521.92	359.22	346.32	283.13	244.58	242.83	262.36	269.69	259.93	319.80
	Final Dry Day Average Daily Flow	331.95	331.37	318.36	411.81	322.47	308.08	257.79	229.12	219.39	226.11	258.10	248.97	288.16
	Final Estimated Infiltration	156.25	155.67	142.66	236.11	146.77	132.38	82.09	53.42	43.69	50.41	82.40	73.27	112.46
	Estimated Sanitary Flow	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70
	Estimated Inflow	31.90	20.97	19.45	110.11	36.75	38.24	25.34	15.46	23.44	36.25	11.59	10.96	31.64

Table 4 - Estimated Community Wastewater Flow Components for 2017											2-May-18		PAGE 12	Annual Average
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(MGD)
Boston (Total)	Raw Average Daily Flow	101.08	97.02	93.43	141.63	97.07	99.04	85.84	79.57	81.86	86.88	80.83	78.26	93.43
	Raw Dry Day Average Daily Flow	88.84	93.30	86.32	108.40	85.02	88.33	78.37	73.46	71.84	74.18	75.99	74.33	83.08
	Raw Estimated Infiltration	30.34	34.80	27.82	49.90	26.52	29.83	19.87	14.96	13.34	15.68	17.49	15.83	24.58
	MWRA Estimated Infiltration	6.58	7.13	5.83	12.42	6.02	5.61	3.73	2.79	2.57	3.06	3.05	3.50	5.17
	Final Average Daily Flow	94.50	89.89	87.60	129.21	91.05	93.43	82.11	76.78	79.29	83.82	77.78	74.76	88.27
	Final Dry Day Average Daily Flow	82.26	86.17	80.49	95.98	79.00	82.72	74.64	70.67	69.27	71.12	72.94	70.83	77.92
	Final Estimated Infiltration	23.76	27.67	21.99	37.48	20.50	24.22	16.14	12.17	10.77	12.62	14.44	12.33	19.42
	Estimated Sanitary Flow	58.50	58.50	58.50	58.50	58.50	58.50	58.50	58.50	58.50	58.50	58.50	58.50	58.50
	Estimated Inflow	12.24	3.72	7.11	33.23	12.05	10.71	7.47	6.11	10.02	12.70	4.84	3.93	10.35
Brookline (Total)	Raw Average Daily Flow	10.31	9.48	8.63	14.56	8.99	8.48	5.86	4.96	5.18	5.59	6.05	5.50	7.78
	Raw Dry Day Average Daily Flow	9.12	8.26	8.18	10.39	8.02	7.06	5.41	4.56	4.78	4.55	5.94	5.42	6.79
	Raw Estimated Infiltration	4.92	4.06	3.98	6.19	3.82	2.86	1.21	0.36	0.58	0.35	1.74	1.22	2.59
	MWRA Estimated Infiltration	0.03	0.02	0.02	0.04	0.02	0.02	0.01	0.00	0.00	0.00	0.01	0.01	0.01
	Final Average Daily Flow	10.28	9.46	8.61	14.52	8.97	8.46	5.85	4.96	5.18	5.59	6.04	5.49	7.76
	Final Dry Day Average Daily Flow	9.09	8.24	8.16	10.35	8.00	7.04	5.40	4.56	4.78	4.55	5.93	5.41	6.78
	Final Estimated Infiltration	4.89	4.04	3.96	6.15	3.80	2.84	1.20	0.36	0.58	0.35	1.73	1.21	2.58
	Estimated Sanitary Flow	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
	Estimated Inflow	1.19	1.22	0.45	4.17	0.97	1.42	0.45	0.40	0.40	1.04	0.11	0.08	0.98
Milton (Total)	Average Daily Flow	3.92	4.06	3.78	6.76	4.02	3.76	2.21	1.85	1.67	1.93	2.44	2.44	3.23
	Dry Day Average Daily Flow	3.62	3.98	3.71	5.10	3.61	3.04	2.02	1.72	1.59	1.70	2.38	2.31	2.89
	Estimated Infiltration	2.22	2.58	2.31	3.70	2.21	1.64	0.62	0.32	0.19	0.30	0.98	0.91	1.49
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
	Estimated Inflow	0.30	0.08	0.07	1.66	0.41	0.72	0.19	0.13	0.08	0.23	0.06	0.13	0.34
Newton (Total)	Raw Average Daily Flow	18.70	18.03	17.57	28.65	17.37	15.88	11.00	9.20	8.74	8.94	10.57	10.16	14.52
	Raw Dry Day Average Daily Flow	17.66	16.61	16.70	24.06	15.90	14.27	10.59	8.67	8.43	8.01	10.25	9.95	13.39
	Raw Estimated Infiltration	9.86	8.81	8.90	16.26	8.10	6.47	2.79	0.87	0.63	0.21	2.45	2.15	5.59
	MWRA Estimated Infiltration	0.02	0.02	0.02	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01
	Final Average Daily Flow	18.68	18.01	17.55	28.62	17.36	15.87	10.99	9.20	8.74	8.94	10.57	10.16	14.51
	Final Dry Day Average Daily Flow	17.64	16.59	16.68	24.03	15.89	14.26	10.58	8.67	8.43	8.01	10.25	9.95	13.38
	Final Estimated Infiltration	9.84	8.79	8.88	16.23	8.09	6.46	2.78	0.87	0.63	0.21	2.45	2.15	5.58
	Estimated Sanitary Flow	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80
	Estimated Inflow	1.04	1.42	0.87	4.59	1.47	1.61	0.41	0.53	0.31	0.93	0.32	0.21	1.13

Table 4 - Estimated Community Wastewater Flow Components for 2017										2-May-18			PAGE 13	Annual Average
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(MGD)
Subtotal	Raw Average Daily Flow	115.42	109.93	106.89	148.29	113.52	115.74	104.10	92.42	97.50	104.10	95.10	89.57	107.63
Northern System CSO	Raw Dry Day Average Daily Flow	97.98	103.70	96.64	107.86	95.54	100.90	90.30	86.07	84.51	86.44	88.54	83.17	93.37
Communities Only:	Raw Estimated Infiltration	27.78	33.50	26.44	37.66	25.34	30.70	20.10	15.87	14.31	16.24	18.34	12.97	23.17
[Sum of Boston (North),	MWRA Estimated Infiltration	2.78	3.15	2.68	3.81	2.74	2.99	2.03	1.63	1.64	2.16	1.40	1.21	2.34
Cambridge, Chelsea,	Final Average Daily Flow	112.64	106.78	104.21	144.48	110.78	112.75	102.07	90.79	95.86	101.94	93.70	88.36	105.28
and Somerville]	Final Dry Day Average Daily Flow	95.20	100.55	93.96	104.05	92.80	97.91	88.27	84.44	82.87	84.28	87.14	81.96	91.02
	Final Estimated Infiltration	25.00	30.35	23.76	33.85	22.60	27.71	18.07	14.24	12.67	14.08	16.94	11.76	20.82
	Estimated Sanitary Flow	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20
	Estimated Inflow	17.44	6.23	10.25	40.43	17.98	14.84	13.80	6.35	12.99	17.66	6.56	6.40	14.26
Subtotal	Raw Average Daily Flow	115.72	112.26	107.85	168.23	114.91	103.40	83.42	68.82	66.22	69.12	78.51	76.53	96.88
Northern System Without	Raw Dry Day Average Daily Flow	108.41	104.09	103.16	139.04	107.01	95.12	76.87	65.26	62.31	62.91	76.68	74.45	89.45
North CSO Communities:	Raw Estimated Infiltration	56.76	52.44	51.51	87.39	55.36	43.47	25.22	13.61	10.66	11.26	25.03	22.80	37.80
	MWRA Estimated Infiltration	3.58	3.14	3.17	5.23	3.31	2.62	1.47	0.83	0.66	0.64	1.61	1.47	2.30
	Final Average Daily Flow	112.14	109.12	104.68	163.00	111.60	100.78	81.95	67.99	65.56	68.48	76.90	75.06	94.58
	Final Dry Day Average Daily Flow	104.83	100.95	99.99	133.81	103.70	92.50	75.40	64.43	61.65	62.27	75.07	72.98	87.15
	Final Estimated Infiltration	53.18	49.30	48.34	82.16	52.05	40.85	23.75	12.78	10.00	10.62	23.42	21.33	35.50
	Estimated Sanitary Flow	51.65	51.65	51.65	51.65	51.65	51.65	51.65	51.65	51.65	51.65	51.65	51.65	51.65
	Estimated Inflow	7.31	8.17	4.69	29.19	7.90	8.28	6.55	3.56	3.91	6.21	1.83	2.08	7.43
Subtotal	Raw Average Daily Flow	244.72	238.61	227.49	367.27	241.88	224.06	169.55	143.78	137.05	145.50	166.52	164.57	205.45
North/South Systems Without	Raw Dry Day Average Daily Flow	229.61	224.87	218.65	299.39	223.53	202.39	159.36	136.08	129.82	130.48	162.02	160.21	189.32
North CSO Communites:	Raw Estimated Infiltration	124.11	119.37	113.15	193.89	118.03	96.89	53.86	30.58	24.32	24.98	56.52	54.71	83.82
	MWRA Estimated Infiltration	9.61	9.58	8.52	17.31	9.19	7.58	4.66	3.06	2.50	2.37	4.79	4.98	6.98
	Final Average Daily Flow	235.11	229.03	218.97	349.96	232.69	216.48	164.89	140.72	134.55	143.13	161.73	159.59	198.47
	Final Dry Day Average Daily Flow	220.00	215.29	210.13	282.08	214.34	194.81	154.70	133.02	127.32	128.11	157.23	155.23	182.34
	Final Estimated Infiltration	114.50	109.79	104.63	176.58	108.84	89.31	49.20	27.52	21.82	22.61	51.73	49.73	76.84
	Estimated Sanitary Flow	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50
	Estimated Inflow	15.11	13.74	8.84	67.88	18.35	21.67	10.19	7.70	7.23	15.02	4.50	4.36	16.14