

PHASE 1 OF THE CONSENT DECREE/ WET WEATHER IMPROVEMENT PROGRAM ACCOMPLISHMENTS THROUGH 2017

MSD is delivering Phase 1 is under the original cost estimate

MSDGC has completed 72 of the required 100 milestones defined in Attachment 1A of the Final WWIP. MSDGC has constructed 102 of the 114 defined projects listed in Attachment 1B of the Final WWIP which are being completed under 133 separate construction contracts; of which 107 have finished construction.

	Total	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Required Milestones	100	12	13	3	4	7	5	9	8	10	29
Completed Milestones	72	12	13	3	4	7	5	9	8	10	7

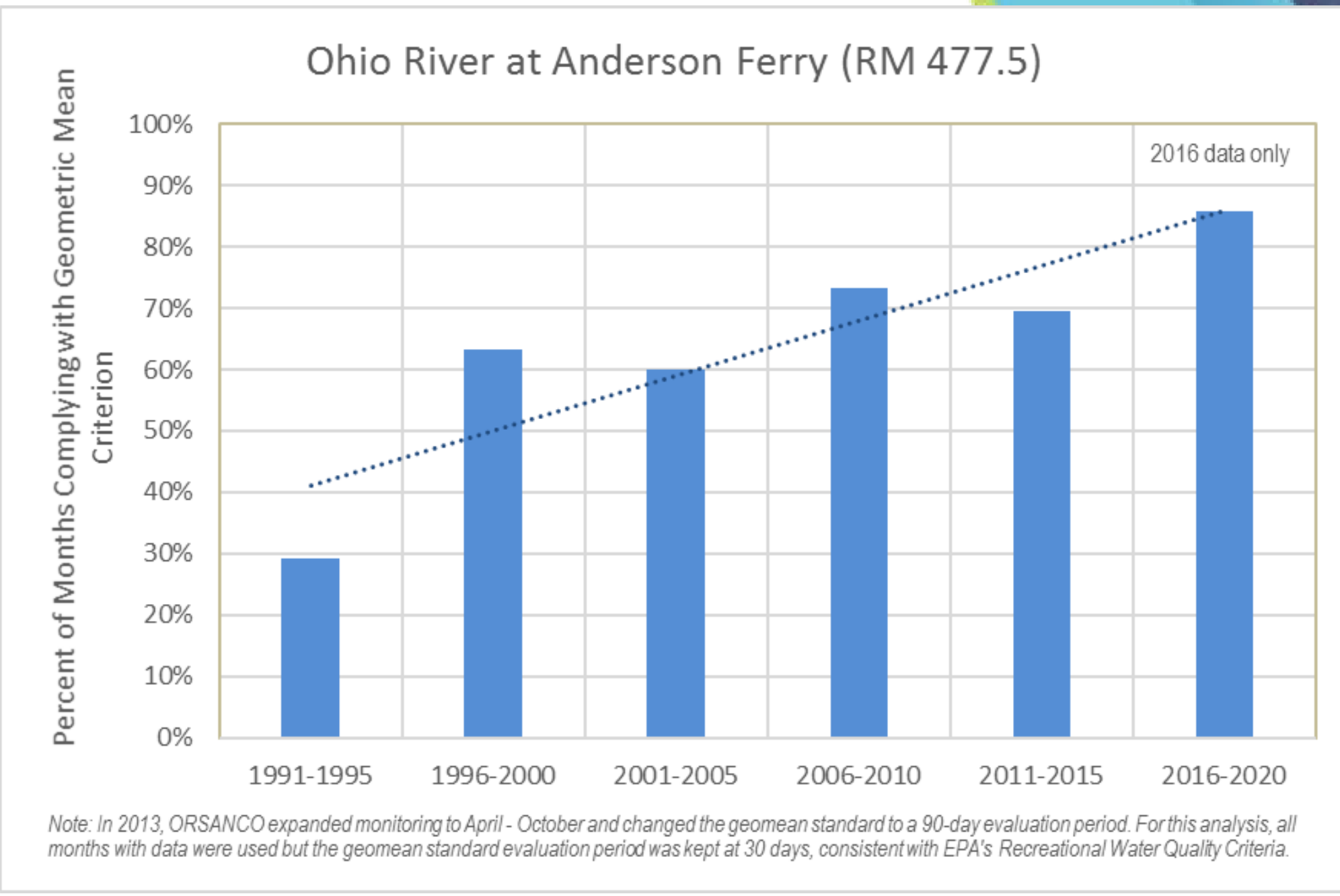
Project ID	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
10120360										
10120420										
10141440										
10141520										
10142440										
10144884										
10145180										
10145280										
10145300										
10150012										
10170560										
10172090										
10180600										

Notes:
 1. Planning for 10170080, 10170100, 10171580, and 10171620 completed under Upper Duck Bundle Planning (10170000).
 2. Design for 10171740 and 10171780 under Oakley Station Project (10171741).
 3. Project 10143920 includes sub-project 10143923 to accommodate right-of-way needs.
 4. Project 10143940 includes sub-projects 10143942 and 10143943 to accommodate right-of-way needs.
 5. Project 10143960 includes sub-projects 10143962 to accommodate right-of-way needs.
 6. Project 10171860 includes sub-projects 10171861, 10171862, and 10171863 to accommodate right-of-way needs.
 7. Projects 10131240 and 10131180 are within a defined bundle of work. Construction was started for the bundle in 2014. Construction finish milestone extended to June 20.
 8. Projects 10171980, 10171920 and 10171900 are within a defined bundle of work. Construction was started for the bundle in 2012 and completed in 2015.
 9. Projects 10143920, 10143940 and 10143960 are within a defined bundle of work. Construction was started for the bundle in 2013.
 10. The PFI, construction start, and construction finish milestones for Project 10131220 were revised by the Regulators in 2013.
 11. The construction start milestone for Project 10130740 was extended by the Regulators to March 2016.
 12. Projects 10145500 and 10145580 were moved to coordinate with Phase 2 Project 10144882 during 2014 Adaptive Management discussions.
 13. Projects 10170080, 10170100, 10171580, 10171620, 10171740, and 10171780 are within a defined bundle of work. Construction was started for the bundle in 2013.
 14. All projects having a defined construction finish milestone are listed herein.
 15. Bundle projects have one PFI and Construction Start Milestone - however each project has a Construction Finish Milestone.

Revised Original Lower Mill Creek Partial Remedy (LMCPR)

- As of December 31, 2016 the LMCPR Program total cost was estimated to be \$233.1 million in 2006\$.
- The LMCPR including the Lick Run Watershed solution for CSO 5 was approved with broad community support and will result in \$170 million less cost than the original deep tunnel solution.

Improving Trends in Water Quality



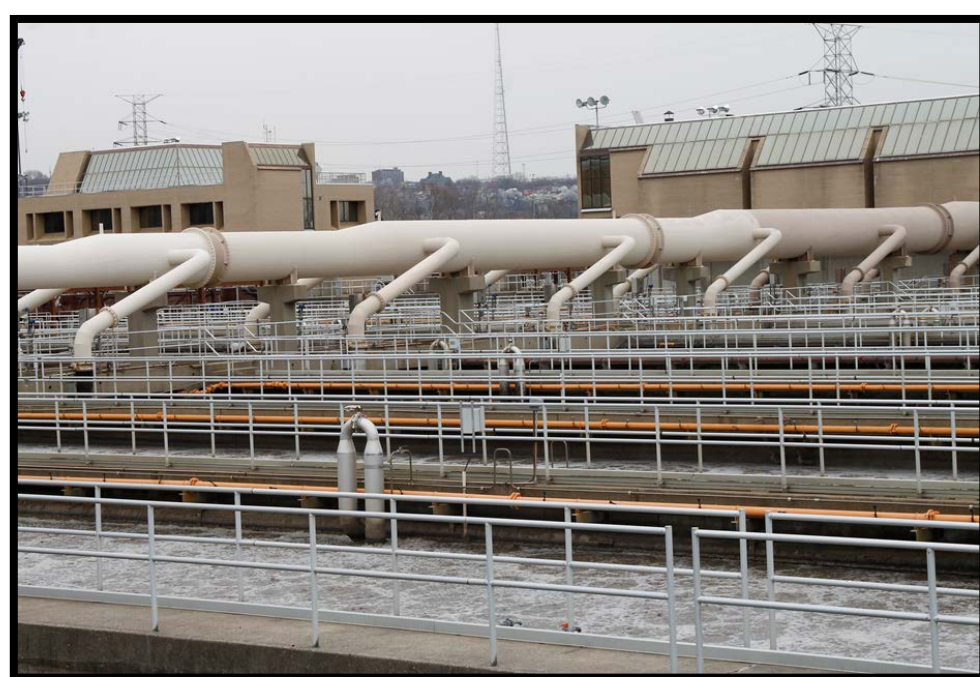
INVESTMENTS LEADING TO THESE ACCOMPLISHMENTS SINCE 2004



Eliminated Point Source Discharges

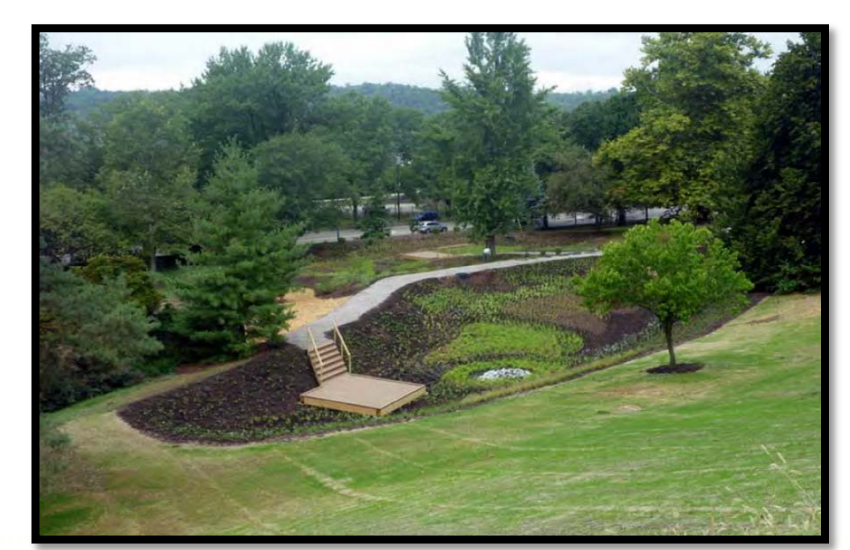
- Home sewage systems = 920 benefitted properties
- SSOs = 43 SSOs eliminated &/or controlled
- SSO 700 = 82% reduction in number of overflow events/year and 85% reduction in average E-coli density
- CSOs = 146 CSOs eliminated, monitoring 201 locations, reduction at least 1 BG overflows/year
- WWTPs = 8 treatment plants eliminated
- Pump Stations = 22 pump stations eliminated & 18 stations upgraded
- WWTP bypasses = 67 WWIP improvement projects at 7 WWTPs to address both dry & wet weather conditions

In total 158 SSOs and 69 PSOs that have been eliminated over the past several decades



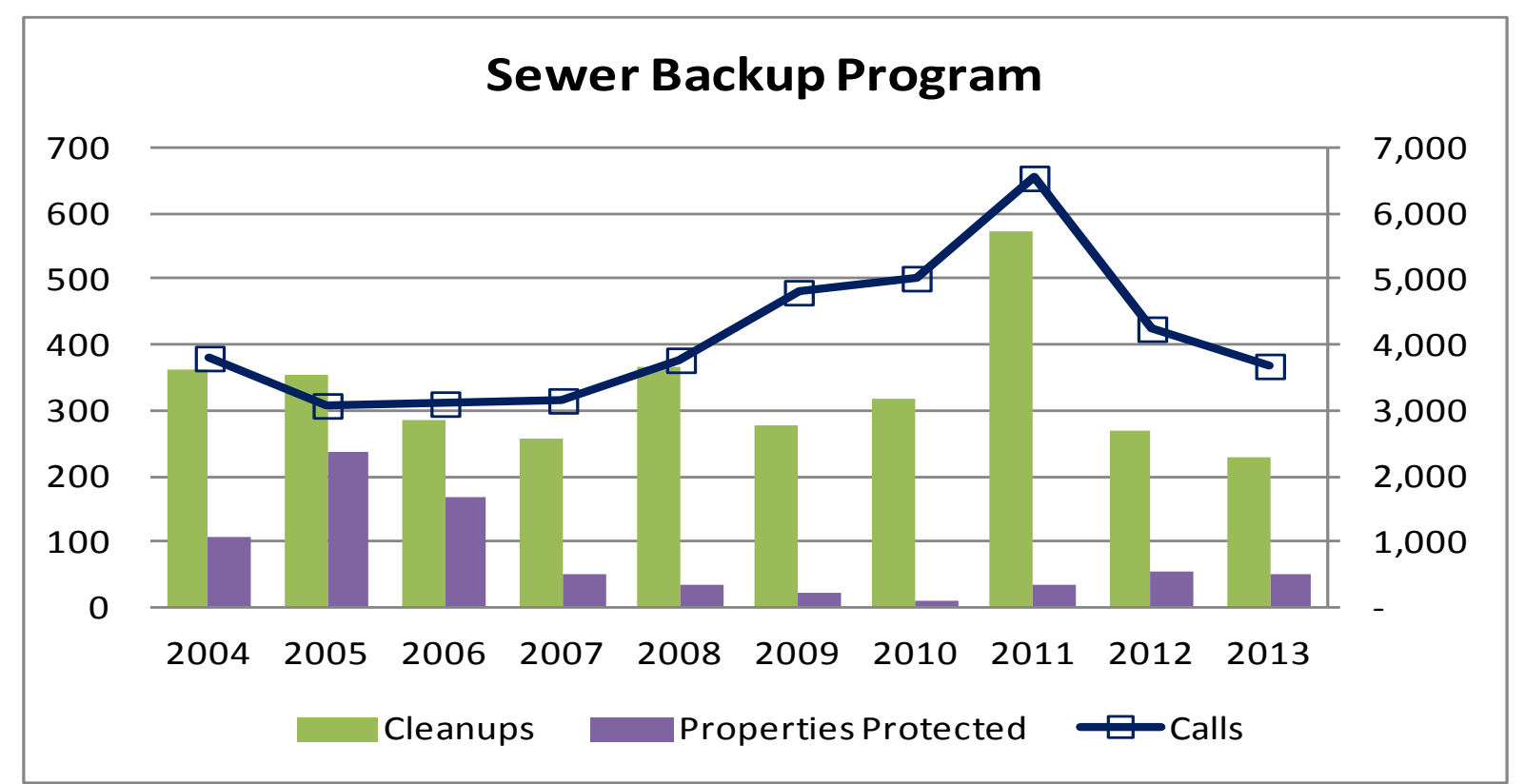
Off-Loaded Stormwater from System

- RTCs = 5 facilities constructed to store flow
- 3.5 miles new storm sewers
- 72 miles of sewers lined & 5,000 manholes rehabilitated to reduce I/I
- Proposed regulations for developers
- 42 million gallons stormwater runoff capture
- 106,000 square feet biofiltration
- 164,000 square feet green roofs
- 344,000 square feet pervious pavement



Protected Public Health

- WIB = 1st program of its kind in the country
- 4,000 properties cleaned and/or protected from sewer back-ups
- 49 miles of sewers replaced to eliminate overflows & surcharging
- 18 miles of new sewers constructed



WWIP Milestones – Phase 1 to be completed by December 2018

Through March 31, 2017 MSDGC has completed 73 of the required 100 milestone as defined in Attachment 1A of the Final WWIP.

MSDGC has constructed 102 of the 114 defined projects listed in Attachment 1B of the Final WWIP which are being completed under 133 separate construction contracts; of which 108 have finished construction.

Of the remaining 25 Phase 1 WWIP construction contracts, nine are under construction, two are in bidding, and 14 are in design.

Phase 1 WWIP Program Costs.

The projects listed in Attachment 1B of the Final WWIP Plan are trending at \$1.05 billion in 2006 dollars as compared to the \$1.14 billion estimated cost of the Phase 1 Program denoted in Attachment 1B of the Final WWIP.

MSDGC has been able to deliver the Phase 1 Program within the initial program estimated cost. Values of individual projects have increased and/or decreased, but the overall program remains on budget.

Phase 1 Asset Management Program Costs.

A total of 379 Asset Management projects (including allowance projects) were advanced or are forecasted to be completed prior to December 31, 2018 as part of the Total Phase 1 Capital Program.

The total cost of these projects was approximately \$680 million (2006\$). Projects were constructed to improve WWTP, pump station, sewer, and watershed management assets.

A total of 57 of the Asset Management projects were associated with \$204 million (2006\$) in allowances.

Sewer Back-Up Program (SBU).

MSDGC has spent approximately \$66.7 million on its WIB/SBU Program from its inception in 2004.

Approximately:

- 4,000 properties have been cleaned and/or protected from sewer backups
- 49 miles of sewers have been replaced to eliminate overflows and surcharging
- 18 miles of new sewers have been constructed
- 825 properties have been protected with devices.

Green Infrastructure

MSDGC continues to implement solutions to keep rain water runoff out of the sewer system. These solutions commonly referred to as “green infrastructure” can range from rain gardens and pervious pavement to bioswales, stormwater detention basins, stream restoration, and bioengineered streams.

Accomplishments include:

- 42+ MG stormwater runoff captured
- 106,000 square feet biofiltration constructed
- 164,000 square feet green roofs
- 4,039 seedlings and container trees planted.

Smarter Sewers.

MSDGC's smarter sewer system will use the existing sewer system more efficiently and cost effectively – using technology and wet weather SCADA system.

For example, when it rains in one part of Cincinnati, the interceptor sewers in that location may be full, but other areas where it hasn't rained may have available capacity.

- This approach allows MSDGC to store flows inside large interceptor sewers, storage tanks, and high-rate treatment facilities in different parts of the system using sensors to measure flow levels and gates and valves to direct the flows. The entire system is controlled by a SCADA computer system. This helps keep sewage in the pipes and out of our creeks.

Hydraulic Modeling.

Based on detailed industry expert reviews, MSDGC has been maintaining a high standard of care since the system-wide model was developed in 2003 to support the LTCP and WWIP development.

The model has been updated regularly and continues to improve with each updated version.

MSDGC leads the industry for model development, improvements and enhancements as demonstrated by the size of the model, peer reviewed published papers on the model, and the use of cutting edge technology such as Geographical Information System (GIS) data, model status report cards, and model calibration and validation dashboards.

Improved Water Quality.

The investments made during the early years of the Consent Decree (2006-2010) were demonstrated to have made a positive impact on the environment.

30% of Mill Creek is attaining water quality standards for aquatic life; Ohio River bacteria levels have improved from 30% compliance during the recreation season in 1990s to 75% in 2010

The Ohio River is safe for recreation 90% of the time during dry weather and is showing significant improvement during rain events; nine sites along the Mill Creek are in attainment for biological water quality standards (none in 1992); sixteen native species have migrated from the Ohio River to the Mill Creek

There is an increased quality of fish and macro-invertebrate assemblages along the lower six miles of the Mill Creek.

Sewer Overflows Reduced by approximately:

43 SSOs have been eliminated or controlled

22 Pump Station Overflows (PSO) eliminated

51 active SSOs and 22 active PSOs remain

18 pump stations have been upgraded

146 CSOs have been eliminated from MSDGC's system with 201 remaining.

Overflows from SSO 700 (the District's largest SSO) have been reduced from 47 activations during a Typical Year to approximately 8 per year. Additionally, SSO 700 has demonstrated 85% reduction in average *E. coli* density.

One of the drivers for evaluating the feasibility of implementing discrete WWIP projects during the Phase 2A Program was to apply the lessons learned during the Phase 1 Program:

- 10 year program duration is appropriate.
- Parametric estimates for large scale projects did not fully consider local conditions.
- Asset Management needs cannot indefinitely be deferred.
- Innovation requires time to demonstrate performance.
- Integrated planning opportunities can offload flow from combined sewer system.
- Several projects provide both an asset management and wet weather benefit.
- Flexibility provided by the allowances is critical to addressing immediate asset management needs as they arise.
- There is less overflow than initially predicted in the original system model.
- The Regulators clarified their expectations regarding program and project changes during the Phase 1 Adaptive Management sessions.
- Local affordability trends have declined since the Final WWIP was approved.
- Effective program implementation requires clarity of governance structure roles.