

STARTING *at the* SOURCE

Report Supplement

December 2018



AN UPDATE ON HOW OUR REGION **IS** WORKING TOGETHER FOR CLEAN WATER



3 RIVERS PROUD

Leading Regional Clean Water Initiatives

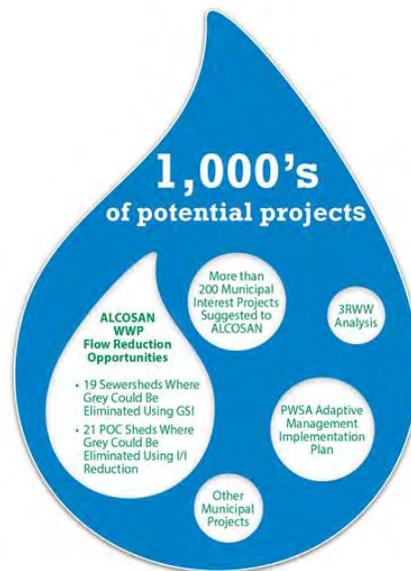
Background

Pittsburgh was born at the intersection of three great rivers, providing its people abundant and accessible water resources that continue to shape and sustain our region to this day. The Allegheny, Monongahela, and Ohio Rivers define us, and are the lifeblood of the region, providing a vibrant place for recreation, a vital public drinking water supply and opportunities for continuing economic growth. Protecting our three rivers, and continuing to take advantage of the economic opportunities they offer, remains as vital to our future as it was to our past.

In recent years, ALCOSAN and its 83 customer municipalities have proudly worked together to improve the water quality of our iconic three rivers and contributing streams. After years of study, regional collaboration and debate, the region is now united in moving ahead with a diverse and adaptive mix of green infrastructure, system rehabilitation, regional conveyance, and expanded treatment that will lead to impressive water quality gains and enhanced quality of life across the Pittsburgh region. This summary provides an update on recent developments related to implementing the Clean Water Plan (formerly called Wet Weather Plan).

Starting at the Source Leads Regional Clean Water Initiatives

In response to public comments on the Draft Clean Water Plan in 2012, ALCOSAN began addressing suggestions to consider how the region might better use emerging technologies, such as green stormwater infrastructure (GSI), in meeting Clean Water Plan objectives. GSI is a technology that can be constructed within municipal business districts, neighborhoods, and parklands to reduce the amount of stormwater inflow to combined sewer systems, thereby addressing the problem at its source. GSI can also provide valuable public education opportunities via visible above ground solutions. ALCOSAN partnered with regional leadership and non-government organizations, including 3 Rivers Wet Weather (3RWW), to evaluate the impact GSI and other source control projects could have on reducing sewer overflows. The study evaluated the potential of various implementation strategies and identified numerous opportunities for GSI, direct stream inflow removal, sewer rehabilitation, and sewer separation projects to play an important role in a more regionally integrated clean water partnership. In 2015, ALCOSAN provided this regional planning level study to its customer municipalities, advocating for more detailed consideration and development of GSI and other source control projects within their jurisdictions, in partnership with ALCOSAN.



The Starting at the Source report identified numerous source reduction opportunities across the ALCOSAN service area.

The Starting at the Source report proposed a path forward that included several flow reduction initiatives describing how our region can work together for clean water. Since 2015, ALCOSAN, the municipalities, and regional partners have made substantial progress in advancing and expanding upon these initiatives.

REGIONAL CLEAN WATER INITIATIVES

- Regional Flow Reduction Partnerships
- Green Revitalization of Our Waterways
- Source Reduction Project Identification and Performance Monitoring
- Municipal Source Reduction Studies
- 3RWW Source Flow Reduction and Flow Target Subcommittee
- Regional Stormwater Plan
- Modified Consent Decree Embraces Flow Reduction
- Regionalization of Inter-Municipal Trunk Sewers
- Expansion of Treatment Plant Capacity
- Preliminary Planning for Regional Conveyance System Improvements

Regional Flow Reduction Partnerships

One of the critical success factors for achieving substantial source flow reduction across the ALCOSAN service area will be intensive coordination amongst stakeholders. This coordination is essential to strategically deploying the additive efforts of all participants for the benefit of the entire region. To strengthen the region's ability to investigate and cost-effectively implement source flow reduction solutions, ALCOSAN has been building the partnerships needed to capitalize on the many opportunities identified in the Starting at the Source report. These partnerships facilitate the collaborative exchange of ideas, technical information, experiences, and lessons learned needed to succeed with source reduction on a regional scale. ALCOSAN has expanded its support to member municipalities, municipal authorities and other stakeholders through participation on committees, individual meetings and workshops, the procurement of national experts, the sharing of technical resources, the funding of source reduction planning, design, and construction projects, and robust advocacy. ALCOSAN continues to develop new ways to engage regional stakeholders as the region expands its knowledge and experience with implementing source reduction technologies. Some of the most prominent regional source reduction partnership activities and regional clean water initiatives are summarized below.

Green Revitalization of our Waterways (GROW) Municipal Partnership Program

One of ALCOSAN's first priorities was to implement a funding program that supports GSI, inflow/infiltration (I/I) controls, direct stream inflow removal and sewer separation efforts that reduce the amount of extraneous flow entering municipal collection systems. ALCOSAN began developing this program in 2015 and launched the first cycle for project grant funding in 2016. All 83 ALCOSAN member municipalities and municipal sewer authorities are eligible to apply for GROW funding. Projects are awarded grants for project design and construction costs based on projected cost-efficiency of sewer overflow reduction performance. To date, ALCOSAN has offered over \$22 Million in three cycles of grant awards for 80 projects distributed among 38 member municipalities and municipal sewer authorities. In total, these projects are anticipated to remove millions of gallons of stormwater and groundwater from the ALCOSAN system annually. In addition, recently constructed projects were eligible for consideration for reimbursement to reward proactive source reduction efforts within the ALCOSAN service area.

In addition, ALCOSAN offers technical and administrative support beyond the GROW grant funding to support municipalities in advancing their source reduction projects. ALCOSAN



***GROW project constructed in 2017 by
PWSA on Hayson Avenue***



***GROW project constructed
by Etna in 2017***

conducted a series of workshops in the fall of 2017 for all member municipalities and municipal sewer authorities to discuss planned source reduction efforts and brainstorm new project opportunities for consideration in future GROW funding cycles. Similar workshops were held in 2018 with ALCOSAN bringing more specific cost-effective project opportunities for municipal consideration. ALCOSAN is also working with other entities in the region to secure additional funding assistance to help municipalities and municipal authorities in advancing cost-effective source control projects.

Source Reduction Project Identification and Performance Monitoring

ALCOSAN is committed to a data-driven process for estimating project performance and has created guidance documents for the municipalities on best practices for projects implemented through the GROW program.

ALCOSAN has implemented a comprehensive flow monitoring and flow isolation study program, conducting this monitoring for its municipalities at no charge. The primary objective of the program is for ALCOSAN to provide data and information to its customer municipalities so they can make informed decisions in identifying cost-effective flow reduction opportunities. This program, which focuses on sewersheds considered to have high levels of excess flow, includes the installation and operation of flow monitoring equipment for designated sites and durations and obtaining nighttime instantaneous flow rate readings to isolate smaller areas of the municipal collection systems that are contributing significant amounts of infiltration.

In addition, ALCOSAN is providing resources to conduct flow monitoring services at no charge to municipalities to help determine how well already-constructed projects perform and to identify future projects.

Municipal Source Reduction Studies

Public comments requesting a closer look at GSI and other emerging technologies for controlling sewer overflows also prompted actions from municipalities and the regulatory agencies. Like ALCOSAN, some of the customer municipalities began studying the merits of GSI and I/I reduction technologies on their own or in collaboration with ALCOSAN's regional Starting at the Source study. In addition, after the 2004 Administrative Consent Orders and Consent Order Agreements with Pennsylvania Department of Environmental Protection (PaDEP) and the Allegheny County Health Department (ACHD), respectively, expired on March 30th, 2015, PaDEP and ACHD issued new orders in October 2015. Under the second orders, the customer municipalities were required to complete a Source Reduction Study (SRS) by December 1, 2017. The intent of the SRSs was to view potential solutions through a new lens. The SRSs analyzed the potential for municipalities to control their sewer overflows with source reduction technologies rather than the conveyance technology solutions proposed in the 2013 Municipal Feasibility Studies. The SRSs were submitted as scheduled and identified areas within municipal collection systems where I/I of stormwater or groundwater might be addressed with source controls. ALCOSAN will be using this information to evaluate the regional implications of municipally proposed source reduction measures on previously identified gray infrastructure needs and to continue coordinating with municipalities on the implementation of cost-effective GSI and other source control efforts.

3RWW Source Flow Reduction and Flow Target Subcommittee

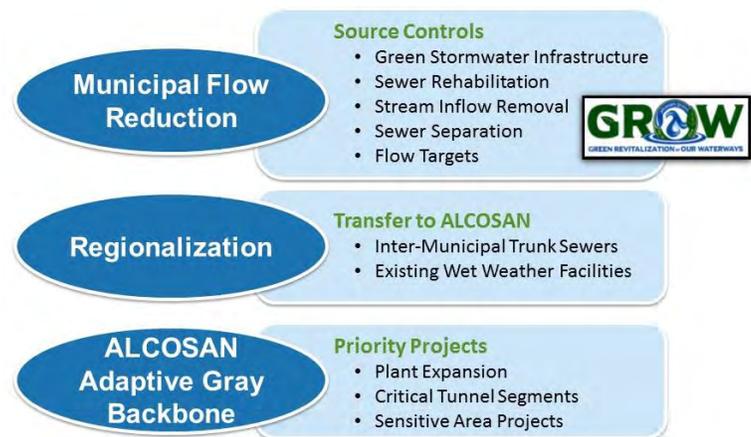
Additional actions by the regulatory agencies signaled a requirement for municipal flow reduction targets and agreements between ALCOSAN and its customer municipalities. In response, ALCOSAN and its customer municipalities began investigating how this might be accomplished productively. A Source Flow Reduction and Flow Target (SFRFT) Subcommittee of the Wet Weather Working Group (3WG), facilitated by 3RWW, was established. This collaborative group was developed through the cooperative efforts of ALCOSAN and representatives of most of the 83 municipalities/municipal authorities within the ALCOSAN service area. Other stakeholders include the Allegheny Conference on Community Development, the Allegheny County Conservation District (ACCD), and Economic Development South. The SFRFT has held more than 30 meetings to discuss technical matters, policy issues, and implementation strategies. The purpose was to develop a consensus-based, long term plan to accomplish source flow reduction in both separate and combined sewer systems, and to incorporate those proposals into the regional Clean Water Plan. In 2017, the SFRFT issued an interim report presenting its work to date and proposed source flow reduction metrics for the ALCOSAN service area. The SFRFT subcommittee is committed to continuing to further address the region's wet weather issues.

Regional Stormwater Plan

Over the past several years, ALCOSAN and regional partners have conducted various stormwater management studies focused on identifying opportunities to prevent extraneous flow from entering municipal collection systems. In 2017, ALCOSAN began development of a Regional Stormwater Plan to coordinate these efforts and advance the identification of sustainable solutions to stormwater management within the ALCOSAN service area. This plan will consider solutions presented in ALCOSAN's *Starting at the Source* Report, the Pittsburgh Water and Sewer Authority's (PWSA) draft *Green First Plan*, in SRSs prepared by customer municipalities and municipal authorities in 2017, and planned public and private construction projects throughout the region. The most efficient areas for implementing source reduction projects will be identified based on their potential to reduce sewer overflow volume. The Regional Stormwater Plan will present opportunities for the region to partner in constructing high-impact and cost-efficient source reduction projects. The report will identify corridors of project opportunities for GSI, I/I reduction and direct stream inflow removal that a single municipality, or multiple municipalities in partnership, could feasibly construct and maintain. Identified source control projects could then be submitted by municipalities for consideration in the GROW program. This regionally coordinated stormwater management approach will enhance GROW program success by highlighting the most promising source reduction opportunities.

Consent Decree Modifications Embrace Flow Reduction

Following submission of the draft CWP in 2013, ALCOSAN and the regulatory agencies began negotiating a modified Consent Decree (CD) that embraces the use of GSI and inflow/infiltration (I/I) reduction and recognizes the financial impossibility of implementing all CD requirements by 2026. Through these discussions, the regulatory agencies required a compliance strategy to proceed with the design and construction of an Interim Clean Water Plan (ICWP) that provides opportunities to integrate GSI and other source reduction practices, while prioritizing the regionalization of inter-municipal trunk sewers and key gray infrastructure projects.

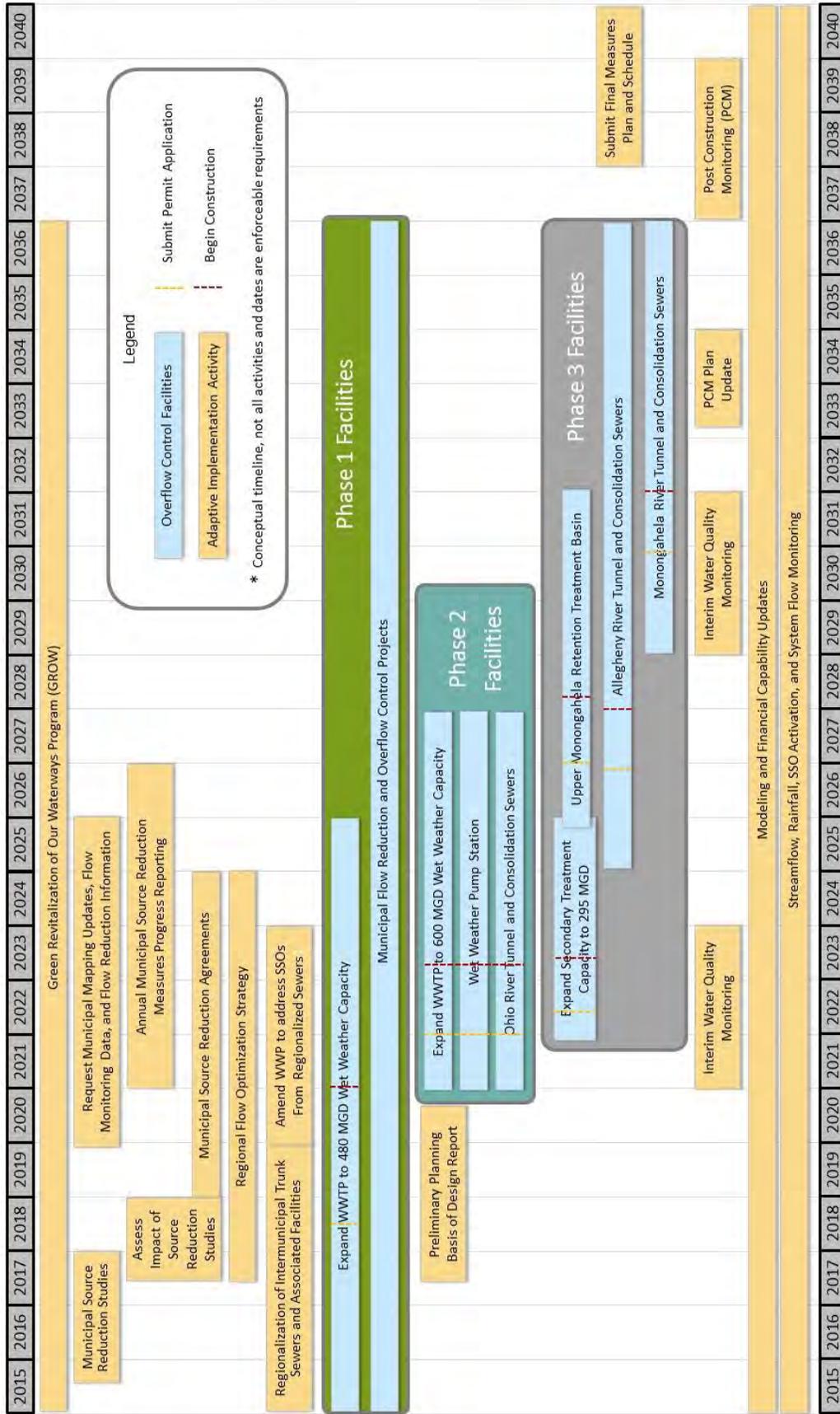


Regulatory Priorities for the Interim Clean Water Plan

Since the identification of specific flow reduction project commitments requires on-going coordination with customer municipalities, the modified CD is based on a phased and adaptive implementation framework that supports early implementation of green projects, demonstration of effectiveness, and the substitution or reduction of gray infrastructure where GSI and I/I reduction can be shown to cost-effectively provide equivalent performance. The modified CD includes several adaptive management milestones where new information can be used to propose modifications to projects and implementation schedules.

The ICWP was divided into three phases. Phase 1 focuses on flow reduction, flow optimization, regionalization, existing infrastructure inspection and rehabilitation, wastewater treatment plant (WWTP) expansion, and preliminary planning for regional conveyance system projects. Phase 2 includes projects that might be influenced by Phase 1 projects. Phase 3 projects represent adaptive projects that may be influenced and modified based on the outcome of Phase 1 and Phase 2 evaluations and demonstration projects.

The ICWP currently includes \$1.6 billion (in 2010 dollars) in identified ALCOSAN projects, plus a commitment to the development and implementation of a regional flow optimization strategy, in partnership with its customer municipalities. Through the adaptive management framework, the ICWP will be revised to include additional ALCOSAN and municipal projects up to a \$2 billion affordability limit. Once regionalization is complete, ALCOSAN will identify priority projects to control overflows along transferred sewers and municipalities will identify gray infrastructure projects that are needed to control municipal overflows which remain their responsibility. Upon completion of the ICWP, post construction monitoring and modeling will be conducted to assess additional controls needed to meet the full requirements of the CD.



Interim Clean Water Plan Adaptive Implementation Timeline

Regionalization of Inter-Municipal Trunk Sewers

As ALCOSAN and its customer municipalities grappled with the complexities of fragmented ownership and responsibility for addressing aging wastewater infrastructure and sewer overflows, they concluded that the regionalization of inter-municipal trunk sewers would facilitate more cost-effective implementation of a regional Clean Water Plan. As a result, ALCOSAN and the municipalities are working cooperatively towards the voluntary transfer of approximately 270 miles of large sewers carrying flow from more than one municipality. ALCOSAN anticipates that regionalization will support flow reduction initiatives, including the prioritization of sewer rehabilitation projects to reduce I/I along transferred trunk sewers.

Of ALCOSAN's 83 customer municipalities, 65 have sewers and facilities under consideration for transfer based on the original criteria established. The inter-municipal trunk sewers and structures/facilities proposed for transfer per the original criteria include:

- ◆ Approximately 270 miles of sewers
- ◆ 79 diversion chambers
- ◆ Four pump stations
- ◆ Four equalization tanks

Since 2015, ALCOSAN reviewed all municipal CCTV inspection data for sewers proposed to be transferred and determined which data will meet ALCOSAN's current needs and standards. For sewers without acceptable data, ALCOSAN conducted CCTV inspections of 237 miles of sewer and visual inspections of more than 7,300 manholes to establish current conditions, including identification. Physical inspections were also performed and evaluations were conducted at eight facilities (pump stations and equalization basins) that address wet weather flow.

Based on these extensive field investigations and municipal coordination, ALCOSAN prepared defect reports for the sewers and municipal regulator reports in each point of connection sewer shed, and evaluation reports for each pump station and equalization tank. Once each report was drafted, ALCOSAN met with impacted municipalities to review findings and discuss options for addressing those more pressing repairs which are a condition of transfer. ALCOSAN has also notified the municipalities of critical defects and is tracking municipal action on the needed repairs. The various investigations have the added benefit of allowing ALCOSAN to establish asset management protocols that will prioritize post-transfer long term repair to develop a Capital Improvements Plan based on factors such as risk and criticality.

To prepare for the transfer process, ALCOSAN worked with 3RWW to propose refinements to the transfer agreement template. In early 2019, ALCOSAN will begin the transfer process with a series of meetings for municipal elected officials. These meetings will present the final transfer agreement template that was approved by the ALCOSAN Board at its September meeting and review the process for finalizing the agreements.

Expansion of Treatment Plant Capacity

With a capacity to treat 250 million gallons per day, ALCOSAN's Wood's Run Wastewater Treatment Plant on Pittsburgh's northside is one of the largest on the Ohio River. Expanding the wet weather treatment capacity by optimizing and augmenting the existing plant facilities has long been a cornerstone in ALCOSAN's strategy for reducing sewer overflows during wet weather. ALCOSAN has embarked on the expansion of the wet weather treatment capacity to 480 million gallons per day (mgd) initially and ultimately to 600 mgd, enabling the capture and treatment of millions of gallons of combined sewage that would otherwise overflow into the region's Three Rivers and contributing streams. ALCOSAN's strategy dates back to its 1996 Act 537 Plan which envisioned phased plant expansions and upgrades to support economic development and sewer overflow reduction.

Phase 1 was completed in 2004. It included the expansion of primary (physical) and secondary (biological) treatment capacities, the conversion of the gaseous chlorine disinfection system to safer liquid sodium hypochlorite, upgrading of the biosolids processing and handling facilities, an extensive odor control system and various upgrades to the plant's electrical system. The plant's treatment capacity was expanded from 200 mgd to 250 mgd and the phase 1 facilities set the stage for phase 2 of the plant expansion. ALCOSAN also completed major capital improvements at the plant to prepare for the implementation of the second phase of plant expansion. These improvements included the construction of new Operation and Maintenance facilities and the upgrading and expansion of the primary pump station that lifts the wastewater from ALCOSAN's deep tunnel conveyance system to the surface for treatment.

Phase 2 of Woods Run Wastewater Treatment Plan expansion focuses on wet weather treatment capacity to allow more sewage to be captured and treated, thereby reducing overflows during rain and snowmelt. The plant upgrades are a foundational component of the Clean Water Plan and Starting at the Source strategy for source reduction through municipal GSI and the reduction of I/I in coordination with the Pittsburgh Water and Sewer Authority's Green First plan and other municipalities SRSs. Major projects include:

- ◆ Upgrading the main pump station to a firm capacity of 480 mgd – completed;
- ◆ Wet weather pump station – to provide 120 mgd of additional wet weather pumping capacity;
- ◆ Wet weather preliminary treatment to provide for a preliminary treatment capacity of 600 mgd;
- ◆ Two additional primary sedimentation tanks to provide 600 mgd of capacity;
- ◆ Two additional final settling tanks to boost secondary treatment capacity to 295 mgd;
- ◆ New secondary treatment and wet weather treatment disinfection facilities using sodium hypochlorite and dechlorination to protect aquatic life in the Ohio River; and
- ◆ The replacement of the existing plant discharge outfall with two new outfalls.

Preliminary Planning for Regional Conveyance System Improvements

Through multiple regional partnerships, ALCOSAN is working together with its customer municipalities to assess the effectiveness of GSI, stream inflow removal, I/I reduction, and existing system rehabilitation efforts through demonstration projects and preliminary planning. Using the source reduction planning information compiled in the municipal SRSs and the ALCOSAN Regional Stormwater Plan, ALCOSAN will evaluate the implications of the proposed source reduction measures on the regional conveyance projects identified in the ICWP. The evolving set of planned source reduction projects to be constructed across the service area will be analyzed collectively to determine if cost-effective downsizing or refinements to regional tunnel segments or other sewer overflow control facilities is feasible. This analysis will occur throughout the preliminary planning of the regional conveyance improvements and will identify the nature of the anticipated modifications, the financial implications and the basis for compliance with the Consent Decree. Identification of potential opportunities is an initial step in this adaptive approach.

In consideration of the SRS submitted by the municipalities, preliminary planning will determine the most cost-effective approach for ICWP projects. Preliminary planning has already established the best means of obtaining 600 mgd of wet weather treatment capacity. This planning will also establish the basis of design for Phase 2 and Phase 3 tunnel projects and the Upper Monongahela retention basin, including any appropriate downsizing and refined tunnel and consolidation sewer construction schedules. The preliminary planning process will include the following activities and culminate in the issuance of a Basis of Design Report.

- ◆ Establishing tunnel lengths, alignment, and sizing refinements
- ◆ Evaluation of wet weather pump station alternatives
- ◆ Geotechnical investigations and assessments
- ◆ Property evaluation and assessment
- ◆ Tunnel system hydraulics and surge analysis
- ◆ Flow management and operational strategies
- ◆ Evaluation of construction packaging and project delivery alternatives

Working Together for Clean Water

ALCOSAN and the region have invested heavily in developing integrated regional solutions to aging wastewater infrastructure and sewer overflow challenges that will improve the quality of water flowing through our Three Rivers and contributing streams. This work led to stronger partnerships and a refined approach to how the region will address wet weather planning and implementation into the future. Regional partners now embrace a common vision, recognizing the challenges ahead in implementing a variety of technical solutions that require

commitments from many stakeholders. That is why extra effort was put into developing a robust implementation framework that provides the flexibility necessary to adapt to improved information, and inevitably changing conditions.

Working together, ALCOSAN and its regional partners have begun the actions necessary to meet the Clean Water Plan schedule and are poised to realize the clean water and quality of life benefits it envisions.