

**Third Party Review of the ALCOSAN
Regional Long Term Wet Weather Control Concept Plan**

**THIRD PARTY REVIEW COMMITTEE
OF THE
ALLEGHENY COUNTY SANITARY AUTHORITY
Allegheny County, PA**

*Third Party Review of the ALCOSAN
Regional Long Term Wet Weather Control Concept Plan*

Executive Summary and Findings

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INTRODUCTION

The **ALCOSAN Regional Long Term Wet Weather Control Concept Plan (Concept Plan)** was developed to address sewer overflows in the ALCOSAN service area. The Third Party Review of the ALCOSAN Concept Plan was conducted under the direction of the Third Party Review Committee formed by the ALCOSAN Board of Directors to address questions raised about the plan by the communities served by ALCOSAN (the Partner Communities). This executive summary focuses on the issues and findings that need to be addressed into the future. To utilize these findings it is necessary to understand the technical and institutional conditions that have made past efforts to address sewer issues in Allegheny County difficult or impossible.



**Mixture of Sewage &
Rainwater Overflowing**

Sewer Structure Designed to Overflow CSO/SSO

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These include the following:

- **Designed to Overflow** - The original design intent and the constructed condition, of the ALCOSAN and the Partner Community systems is that the sewers overflow to the streams and rivers of Allegheny County a mixture of rainwater and sanitary sewage during wet weather. This is not a system that has exceeded its capacity, or has deteriorated and as a result is overloaded and overflows. This is a system that was first designed, then approved by state regulatory authorities and finally constructed to overflow during wet weather. The system was likely built and approved to function with overflows based on the belief that overflows during wet weather would be acceptable.
- **CSO/SSO?** - Some of these sewers are “combined” sewers that are designed and built to convey all the rainwater and sanitary sewage from their drainage area. Other Partner Community sewers have been labeled “separate” sewers, containing only sanitary wastewater. However, the Partner Community separate sewers all carry a large amount of wet weather increased flow. In addition, the combined areas and the separate areas are connected and cause inter-related overflows. While combined sewer interceptor systems are designed to overflow during wet weather, the sewer systems labeled as separate in Allegheny County appear to have been sized to carry more flow than a typical separate sewer system. The ALCOSAN interceptors are designed to overflow excess rainfall induced flow at the point of connection to the ALCOSAN system irrespective of the label placed on the sewer feeding the ALCOSAN system. It is unclear as to the regulatory status of these systems as separate or combined; however, it is clear that the systems were originally designed and approved with designated overflow structures. In any case and irrespective of the label placed on these systems, the water quality impacts caused by the overflows need to be addressed. It should be understood, however, that the label of separate or combined does not necessarily have the same meaning in Allegheny County as intended by national policy on these matters.
- **Small Communities** - The 83 Partner Communities of ALCOSAN include many very small municipalities, some fewer than 1,000 people. It is impractical for these very small communities to address the administratively complex requirements of today’s clean water regulatory environment on their own.
- **Authority** - The tradition, politics and legal agreements between ALCOSAN and the Partner Communities vest limited central authority in ALCOSAN to address local sewer issues. As a result, neither the large capable authority, nor the small Partner Community is equipped to fully address the issues and needs.

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➤ **Progress** - In spite of these difficult institutional and technical issues, the Partner Communities have moved forward with rainleader disconnect programs, and significant monitoring and rehabilitation has occurred. In addition, ALCOSAN has attempted through planning, construction and multiple reviews of its plans to address wet weather needs within the confines of these institutional issues.

➤ **Ineffective Enforcement** - The historical regulatory programs have not recognized the institutional, technical or water quality issues. Historical enforcement has been selective and ineffective at dealing with the institutional issues. For example ALCOSAN has a permit that requires the development of a CSO Long Term Control Plan for its 24 CSO outfalls. The permit does not discuss SSO. The Partner Communities will ultimately have to develop their own plans. However, the Partner Communities cannot develop their own plans without knowing the extent to which they can rely on ALCOSAN to accept their flows. To date there are no means of addressing the coordination needs. Water Quality Standards (WQS) are not being addressed by the regulators, in permits or in the planning for facilities. While there has been verbal commitment to considering these issues, the proposed enforcement documents have not yet been able to address the full range of issues and needs.

Overall Findings

In the following sections there are key findings with respect to the details of the Concept Plan. These overall findings need to be understood at the political level of Allegheny County.

Watershed Approach Needed

1. The waters of Allegheny County are impaired by sewer overflows and other sources of pollution (such as acid mine drainage). A watershed approach that addresses sources of impairment beyond sewer overflow is needed to address this impairment.

Money Needed

2. The total costs of addressing the impaired waters of Allegheny County will be substantial. It is likely that State and Federal Grant funding will be needed to address the issues.



Acid Mine Drainage
Impacted Creek

New Regulatory Approach

3. The previous regulatory and institutional approach to LTCP development was impracticable. A new approach is needed that recognizes and addresses the institutional and technical issues of all impacted parties.

Concept Plan

4. The ALCOSAN Concept Plan will be an important part of addressing County water quality needs. The Plan needs to evolve into detailed facility plan(s) that address Clean Water Act requirements with implementation that is affordable and fair.



Combined Sewage to Chartiers Creek

Balance of Rehabilitation and Treatment

5. Municipal rehabilitation and conveyance for treatment at an expanded ALCOSAN plant will be important aspects of the solution. However, it is imperative that the cost of specific types and locations of rehabilitation be known and balanced against conveyance and treatment before large investment in rehabilitation is made.

SUMMARY AND KEY FINDINGS

Background and Purpose

The Allegheny County Sanitary Authority (ALCOSAN) has provided wastewater conveyance and treatment to Allegheny County member communities since the late 1940s. This service has been extended to include 83 diverse communities ranging in population from 400,000 to less than 500 people. These Partner Communities own and operate their own collection systems. Most of these collection systems existed prior to the creation of ALCOSAN and its system of tunnels and treatment plant. The ALCOSAN system was designed to convey dry weather flow from the Partner Community collection system to the ALCOSAN treatment plant (WWTP) located on the Ohio River. The ALCOSAN interceptor system was designed to include more than 300 overflow points throughout the County. During wet weather conditions, the designed carrying capacity of the ALCOSAN system and in some cases the satellite collection system is exceeded. During these wet weather conditions, a mixture of stormwater, groundwater and sanitary sewage can be discharged into the streams and rivers of Allegheny County at these 300 plus overflow points. This was the original design intent of the system.

The satellite collection systems in the communities have been categorized into two types:

- **Combined Sewer Systems** – These systems are designed so that all sanitary wastewater and generally most or all storm water are conveyed in a single pipe. In some cases the combined sewer has replaced the original creek. Overflows from these systems are referred to as Combined Sewer Overflows or CSOs.
- **Separate Sanitary Systems** – By definition these are sewer systems that are designed to carry only sanitary wastewater. In practice, these systems are usually designed to carry some groundwater that infiltrates into the sewer through leaks in the system. In the case of the ALCOSAN Partner Communities, the systems designated as separate have the capacity to carry much more flow than a typical separate sewer system. In practice and historically these separate systems carry some stormwater from rainleaders (roof drains) and storm water induced infiltration and foundation drains. As such, many of these satellite systems are not truly separate. Overflows from Separate Sanitary Systems are referred to as Sanitary Sewer Overflows or SSOs.

These wet weather sewer overflows cause water quality impacts on the receiving streams and create a potential threat to public health. The receiving waters impacted by sewer overflows in the ALCOSAN system are also impacted by other pollutant sources. A short list of sources include:

- Separate Sewer Overflows
- Combined Sewer Overflows
- Urban Stormwater
- Acid Mine Drainage
- Upstream sewer overflows from other Communities
- Wildcat sewers – communities with sewers, but no treatment

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- Failing septic systems
- Agricultural runoff

A Regional Long Term Wet Weather Control Concept Plan was issued in 1999 principally to address the separate and combined overflows from the ALCOSAN system. This Third Party Review has been conducted to address questions raised about the Concept Plan and to suggest a way forward.

The Regulatory Environment

Point source discharges that include sewer overflows, wastewater treatment plant discharges and urban stormwater discharges are regulated under the Federal Clean Water Act and the Clean Streams Act of Pennsylvania. The Pennsylvania Department of Environmental Protection (PaDEP) is charged with regulating SSOs and CSOs through the permits issued under the National Pollution Discharge Elimination System (NPDES). The United States Environmental Protection Agency (EPA) has delegated NPDES permitting authority to PaDEP, but continues in an oversight and discretionary enforcement role. The principal goal of the NPDES permitting program is to ensure that these discharges include limitations that prevent violations of Water Quality Standards. ALCOSAN's NPDES permit requires the development of a Long Term Control Plan to address the CSOs it owns. With the exception of Pittsburgh, the Partner Communities with CSOs also have permits requiring them to develop individual Long Term Control Plans for their CSOs. The SSOs are not permitted.

Due to the continuing water quality problems and inadequacy of permits, there are a number of enforcement actions underway through lawsuits and the regulatory agencies. ALCOSAN has attempted to address issues beyond its CSOs by extending its CSO LTCP to address satellite system SSOs at the point of connection to ALCOSAN's system. This extended LTCP is the Regional Wet Weather Long Term Control Concept Plan (RWWLTCCP or Concept Plan).

The Concept Plan

The Concept Plan was developed to address both CSO and SSO at the point of connection to the ALCOSAN service area. The plan has been developed to a "conceptual" level to establish the outer boundary financial requirements for the region and to propose an approach to achieve regulatory compliance. The meaning of a Concept Plan - as opposed to facility plans of more detail - has been a source of much confusion and concern.

The key components of the Concept Plan are summarized as follows:

- Modify and expand the wet weather treatment capacity of the ALCOSAN wastewater treatment plant to accept the maximum practicable amount of flow that can be conveyed by the existing dropshafts, river crossings and tunnel system configuration. This maximized flow is proposed to be treated utilizing an expanded WWTP with 310 mgd peak secondary treatment capacity and 565 mgd wet weather treatment for a total of 875 mgd. The treatment plant portion of the Concept Plan has advanced to the facilities planning stage. Specific facilities, site and costs for these facilities have been developed. It is a cost effective component and should move forward.

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- To address CSOs, capture for treatment 85% of the Combined Sewer System Wet Weather Flow.
 - Generally for flow not able to be conveyed at river crossings or through the existing tunnel system to the wastewater treatment plant, utilize remote treatment technology built in the Partner Communities to treat overflows to a primary treatment level without disinfection. The Concept Plan uses a treatment technology referred to as “Swirls” for developing concept costs.
 - Increase ALCOSAN’s conveyance capacity to the wastewater plant. Where conveyance to the wastewater treatment plant or swirl treatment was considered impractical, sewer separation was used to develop a cost placeholder during this conceptual phase.
 - The resulting community CSO treatment facilities include 10 swirl facilities ranging in size from 10 mgd to 131 mgd with a total combined capacity of 481 mgd.
 - These CSO facilities costs were estimated at a concept level including costs for ALCOSAN interceptors and treatment only. Costs to convey flow to the ALCOSAN owned interceptors were not included.

- Eliminate SSOs by providing for conveyance and secondary treatment of all (wet and dry) separate area flow by the following means:
 - Increase conveyance capacity along ALCOSAN’s interceptors to the tunnel system.
 - Where increasing conveyance facilities is impractical, provide storage facilities to hold flow for conveyance and treatment after wet weather conditions had passed.
 - The resulting community SSO facilities include 5 previously planned storage facilities plus 12 newly proposed storage facilities ranging in size from 1.1 mg to 26 mg for a total of 17 remote storage facilities with approximately 138.6 million gallons of total storage volume.
 - The SSO elimination costs were estimated at a concept level including the costs for ALCOSAN interceptors and storage only. Costs to convey flow to the ALCOSAN owned interceptors were not included.

- Complete comprehensive municipal collection system rehabilitation and/or reconstruction program for both the combined and separate sanitary sewer systems to be carried out over a 50-year time frame with 40% of the effort complete in the first ten years and 15% completed each of the following decades.



130 MGD SWIRL Facility - Columbus, Georgia

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The cost for this Concept Plan is summarized as follows:

Plan Element	Cost - Millions
Expand the ALCOSAN WWTP Wet Weather Capacity	\$ 210
Provide Conveyance and Swirl Treatment to meet the Presumptive Approach in each basin	\$ 155
Provide Conveyance and Storage facilities to prevent SSOs along the ALCOSAN System	\$ 745
Provide CSO conveyance or treatment to address combined flows not reaching the ALCOSAN System	Not Included
Provide SSO conveyance, storage or rehabilitation for flows not reaching the ALCOSAN System	Not Included
Rehabilitation and or replacement of collector system	\$1,900
Total Estimated	\$3,000 Plus

The expansion of the wet weather capacity of the ALCOSAN Wastewater Treatment Plant (WWTP) to maximize the use of the tunnel system is an effective and worthwhile project. It should move forward. This was the basis of the Long Range Facilities Plan in the mid-1990s and was one of the precepts of the ALCOSAN Concept Plan. Phase I of this program is underway. The other elements of the plan are still in the conceptual phase of development.

Issues Raised and Addressed

A number of issues have been raised with respect to the Concept Plan. These include the following:

- What Are The National Trends For The Plan To Consider?
- Is The Municipal Collection System Rehabilitation and Reconstruction Program Reasonable?
- Is The Allocation Of Resources Reasonable?
- Does The Plan Meet Regulatory Requirements Of CSO And SSO?
- Does The Plan Address Water Quality Standards?
- Are There Technical Aspects Of The Plan That Need To Be Reconsidered?
- Is The Plan Affordable?
- How Can The Plan Be Funded?
- What Institutional Changes Are Needed?
- How Can The Watershed Approach Be Used To Prioritize The Program?
- What Is The Path Forward?

Each of these is discussed below.

National Trends

Key Finding: *The Concept Plan was developed prior to Congress requiring all Permits and Orders to comply with the National CSO policy. With this change there are a number of national trends relevant to the Concept Plan. These include:*

- ***Enforcement Trends***
- ***Trends in Technology***
- ***Trends in Funding***
- ***Trends in Goals***

Un-permitted SSO and CSO discharges have been illegal since Congress passed the Federal Water Pollution Control Act (now the Clean Water Act – CWA) in 1972. Permitting and enforcement for SSOs was largely a State matter until specific Federal policies for these discharges were developed in the 1990s. Some states began aggressively addressing wet weather overflows in the 1970s and 1980s. Until very recently PaDEP has not seen SSOs or CSOs as a high priority. However, as a result of recent congressional action and Presidential directive, state and federal enforcement of permitting requirements for overflows has become a priority. The state agencies, including PaDEP are being required to put these discharges under permits or enforcement orders.

In a survey of 275 Long Term Control Plans the ten most common technologies applied to CSOs are shown as follows:

LTCP Control Technology	Category	# of Plans With Technology
Sewer Separation	Collection	223
Sewer Rehabilitation	Collection	72
Retention Basins	Storage	71
Primary sedimentation	Treatment	69
Disinfection	Treatment	67
Storage Tunnels and Conduits	Storage	66
Upgraded WWTP Capacity	Treatment	64
Outfall/Relocation/Elimination	Collection	62
Upgraded Pump Stations Capacity	Collection	53

The communities represented in the table above range from small communities under 50,000 people to very large communities with over a million people in the metropolitan area. As shown, most plans incorporate some sewer separation. In some cases it is the only technology applied. However, sewer separation will not necessarily address water quality concerns if the stormwater discharged after separation continues to pollute the receiving stream. Some communities have demonstrated that sewer separation increases total pollution over even a moderate level of CSO control (Richmond, Virginia; Washington, DC). As a result separation is being used less and

less by large cities with significant water quality problems. Sewer Rehabilitation is included in many plans to reduce flows. Retention, tunnel storage and treatment plant improvements are also quite common. The swirl technology proposed is applied in relatively few locations. In some locations where swirls have been built for demonstration or pilot testing, the results of these tests have concluded that additional swirl technology will not be installed. For larger municipal systems, convey and treat or store, convey and treat at the WWTP appears to be the most common approach.

The large CSO programs that were begun in the 1970s received substantial federal funding. The local costs of some of the programs have been funded by a combination of sales taxes, real estate taxes and sewer use fees. The federal grant program of the 1970s and 1980s has largely been converted to a state revolving fund (SRF) loan program. Although a substantial amount of this SRF money has gone to CSO work in other states, Pennsylvania has not funded CSO programs with its SRF money. In addition, direct congressional grants to cities to fund CSO programs have continued on a site-specific basis.

In the past, many programs have focused on meeting a technology level of treatment rather than focusing on meeting Water Quality Standards. Codification of EPA's CSO Policy and EPA's renewed commitment to ensuring LTCPs will achieve appropriate WQS mandates that the final ALCOSAN LTCP be integrated with WQS.

Municipal Collection System Rehabilitation And/Or Reconstruction Program

Key Finding(s): The costs and cost effectiveness associated with the municipal rehabilitation plan are not well defined and not yet balanced with the convey, store and treat aspects of the plan. This needs to be done before facilities in the Partner Communities move forward.

One aspect of the Concept Plan that has been controversial is the Municipal Collection System Rehabilitation and/or Reconstruction Program to reduce infiltration and inflow (I/I) into the sewers. Important issues with respect to this program include the following:

- Peak wet weather flows from the separate areas are relatively high in comparison to truly separate systems. The Concept Plan is based on existing flows from the separate areas of approximately 1,000 gallons per person per day. Typical water consumption would be 50 to 100 gallons per day per person. The difference between the water consumption and the peak flows is comprised of water that infiltrates into the sewers from groundwater and inflow that reaches the sewers through roof drains and other stormwater. This additional flow is referred to as infiltration and inflow or simply I/I.
- The Concept Plan estimates the cost of abating this infiltration and inflow at \$ 2 billion. This investment is intended to reduce the wet weather peak flow from all collection systems in the direction of the state design standard of 250 gallons per person per day for separate systems. Due to the nature of the separate systems it is unclear that this standard is achievable, even with this investment.

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- In the 1970s and 1980s, federal grants to build treatment facilities were sometimes contingent on removing “cost effective I/I identified through a Sewer System Evaluation Study (SSES). The cost effective level of abatement that would be recommended out of a typical SSES is well below the level of investment recommended in the Concept Plan. However in many of the Partner Communities, the SSES level of control would not likely reduce I/I to the state design standard. This raises the issue of should I/I be reduced to the cost effective level or to a “state design standard”.
- There are a number of specific I/I problems in the satellite systems for which the cost of abatement is not yet known.
- Even though the cost of extensive rehabilitation is included as a part of the Concept Plan, ALCOSAN Concept Plan facilities were planned as if no reduction in flow were achieved by the investment in the satellite systems. This has raised the following questions:
 - If storage, conveyance and treatment are being provided by ALCOSAN for this I/I, why does it also have to remove from the system?
 - After the sewer rehabilitation is complete, will the storage basins always be empty?

These issues are addressed under the Path Forward discussed below.

Allocation of Resources

Key Findings: The costs for the Partner Communities to convey their flow to ALCOSAN’s enhanced interceptors has not been developed or estimated. There is a need to determine how costs will be equitably allocated among the Partner Communities that are served by ALCOSAN interceptors as well as to those with their own interceptors.

The Concept Plan is designed and costed to identify facilities that address all CSOs and SSOs at the point of connection to the ALCOSAN interceptors. Specific facilities required away from the ALCOSAN owned system are not addressed, except through the Municipal Collection System Rehabilitation and/or Reconstruction Program. As a result the Concept Plan includes only storage, conveyance and treatment facilities adjacent to the ALCOSAN owned interceptors and tunnels.

This has the following cost implications:

- For the four interceptor systems that are owned by ALCOSAN there may be a need for additional trunk sewer conveyance capacity to get the wet weather flows to the ALCOSAN system. Trunk sewers are the sewers within a drainage basin that convey flow to the interceptor. The cost of trunk sewer capacity improvements are not included in the Concept Plan.
- For the 16 interceptor systems that are owned by the Partner Communities, it is likely that these interceptors, (like the ALCOSAN interceptors), will require additional conveyance, storage and treatment facilities. Additional trunk sewers may also be required. These **non-**ALCOSAN interceptor costs and trunk sewer costs are not included in the Concept Plan.

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- Because the Concept Plan does not include all the necessary costs described above and there is an uneven distribution of investment between the ALCOSAN owned interceptors and the community owned interceptors, there is a concern that an inequity may develop in the implementation and funding of the plan. This inequity may arise under the following conditions:
 - The Concept Plan was to proceed and be funded under the current ALCOSAN cost recovery method (the water bill). Most communities would pay the same rate per gallon of water delivered.
 - The communities served by the 16 non-ALCOSAN interceptors and the communities served by the 4 ALCOSAN interceptors would participate in paying for the facilities needed for the 4 ALCOSAN interceptors.
 - The communities served by the 16 non-ALCOSAN interceptors would have to pay for their own interceptor without contribution from ALCOSAN. This would be in addition to contributing to the 4 ALCOSAN interceptor costs.

It is important to note that the Concept Plan does not specifically address how to pay for any proposed facilities. The potential cost inequity could be addressed in a variety of ways. An approach to addressing these issues is discussed hereafter. However it is paid for, the infrastructure to convey flow to the interceptors is not fully addressed by the facilities or costs identified in the Concept Plan.

Regulatory Requirements CSO and SSO

Key Findings: The Concept Plan does not yet completely address certain regulatory issues including:

- ***Water Quality Standards***
- ***Certain aspects of public participation***
- ***Sensitive areas***
- ***Evaluation of a range of alternatives***
- ***Financial Capability – Particularly that of disadvantaged communities***

Some of these issues have developed into requirements after the plan was called for in ALCOSAN's permit or after the Concept Plan was issued. Some of the issues are more appropriately addressed during facility planning.

The Concept Plan was developed to address requirements in the 1995 ALCOSAN NPDES permit. The original permit required ALCOSAN to address only 4 of the area CSOs that PaDEP attributed to ALCOSAN. An additional 17 CSO points were later added by permit amendment. ALCOSAN extended the scope of the plan to address SSOs along its system. There were a series of specific reports due to PaDEP on a schedule. It is the understanding of the Third Party Review that ALCOSAN has met its obligation by delivering these reports in accordance with the permit deadlines. Since the issuance of the permit, a number of developments in law, policy and guidance have changed the regulatory requirements for addressing CSO and SSO. In addition, as a result of discussions with EPA and others, the plan was proposed at a Concept Level, not a facility planning level.

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As a result of all these factors, issues that need to be addressed in a regulatory context include the following:

- Detailed Monitoring and Modeling to Assess Water Quality Impacts. Water Quality monitoring and modeling are needed not only to determine what needs to be done, but also to determine what actions and controls will provide the most cost effective benefit in a timely manner. Eliminating a small once a year SSO located 100 yards downstream of a large CSO that overflows once a week should not be as high a priority as taking a CSO out of a park area. Monitoring and modeling under a watershed approach will reveal these contrasts and help prioritize the investment of limited public funds. Other cities have invested large funds in overflow controls, only to find the public to be dissatisfied that priority problems (such as overflow in parks) have not been addressed. These cities have faced subsequent and draconian enforcement.
- A Public Participation Program, which specifically involves impacted stakeholders in the selection of facilities plans should be developed.
- PaDEP in cooperation with the stakeholders needs to better address sensitive areas. The facility plans need to evaluate elimination or relocation of CSOs from these areas.
- A wider range of alternatives needs to be evaluated to establish a knee of the curve analysis to show the point where the increment of pollution reduction achieved in the receiving water diminishes compared to the increased costs.
- As indicated in the EPA CSO report to Congress last year, during the LTCP process Water Quality Standards should be reviewed and where appropriate revised. This process requires the cooperation and participation of PaDEP during the development of facility plans. Unfortunately, PaDEP has refused to review water quality standards in conjunction with LTCP development and implementation. Instead, PaDEP is proposing to explore water quality standards reviews in their next triennial review. It is imperative that PaDEP conduct a WQS review as the final LTCP is developed during the facilities planning process. ALCOSAN and the Partner Communities should insist on this approach.
- A full financial capability analysis needs to be conducted, in particular, considering the full Clean Water Act financial impacts on disadvantaged communities.

Technical Aspects

The Concept Plan relies heavily on the use of swirl concentrators as a treatment technology. The effectiveness of the swirl concentrator technology has been inconsistent across the country. While this technology has been a success in some places, demonstration projects in other locations have concluded that the technology does not meet local needs. A review of the effectiveness of the technology to provide water quality use improvements to the specific waters of Allegheny County should be conducted prior to investing in this or any technology. Further, the plan calls for many treatment and storage facilities away from the main ALCOSAN treatment plant. The operation and maintenance of such remote facilities can be a burdensome and sometimes even impractical approach. Some communities have had considerable difficulty in

maintaining even a limited number of such remote facilities (Atlanta, Georgia). Other communities have embarked on plans for multiple facilities in the community only to find out that it was a practical impossibility to place sewage treatment facilities in neighborhoods (New York City). While the remote facilities approach has been successful and economical in some communities (Columbus, Georgia), this aspect of the plan should be carefully considered before proceeding.

Address Water Quality Standards

Key Findings: The Concept Plan uses the Presumption Approach to select the level of control. To use the Presumption Approach, PaDEP must be able to reasonably determine, based on the monitoring and modeling, that Water Quality Standards will be met. Conceptual Modeling done as a part of this review indicates that Water Quality Standards are unlikely to be achieved with the Concept Plan. For the Concept Plan, or any other plan to be approved, Water Quality Standards must be addressed. It is recommended that a wet weather use and water quality standards review/revision be conducted as a part of the Long Term Control plan under a watershed approach.

The conceptual screening level modeling conducted under this review indicates that the bacteriological water quality standards are unlikely to be met by the Concept Plan. These standards are intended to protect the public health of people using the waters of Allegheny County and the nation. Addressing CSOs is important to addressing this problem, but it cannot be the only pollution issue addressed. EPA's National CSO Policy includes two approaches for selecting a level of control to address water quality problems associated with CSOs. These are the Presumption and the Demonstration Approaches.

The presumption approach in the National CSO policy calls for a defined level of CSO control. In the case of the Concept Plan, the level chosen is primary treatment for 85% of the total combined flow. Under the alternate demonstration approach of the National CSO Policy, there is no defined level of control; rather the plan must demonstrate that the level of control is adequate to meet Water Quality Standards.

The CSO Policy provides that a community may follow the presumption approach where the presumption that water quality standards will be met by the proposed long-term controls "is reasonable in light of the data and analysis conducted in the characterization, monitoring, and modeling of the system and the consideration of sensitive areas...."

Thus under the presumption approach, where water quality standards are unlikely to be met, either the water quality standards must be revised so the presumption approach is adequate or the demonstration approach must be used to determine a program that will meet current or revised Water Quality Standards at a level of control greater or lesser than the presumption approach.

ALCOSAN and its Partner Communities have the option of pursuing either the demonstration or presumption approaches (or a combination in different basins/subbasins). In either approach, water quality standards must be achieved. The demonstration approach offers more flexibility on the levels of control applied.

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The Concept Plan does not include disinfection at facilities remote from the treatment plant. Providing disinfection may assist the Concept Plan in meeting water quality standards, however, this would increase the cost and operational complexity of the plan. In any case, there is a need to determine if water quality standards are likely to be met for this approach to be approvable by PaDEP.

The Clean Water Act requires PaDEP to evaluate the waters of the state, including the waters of Allegheny County, to determine which are not meeting water quality standards and why. Ultimately, PaDEP must determine the Total Maximum Daily Loads (TMDLS) of each impacting pollutant receiving water can assimilate and still meet water quality standards. A plan to address these loads must be developed so WQSs can be met. The waters of Allegheny County are impacted by a variety of sources. As discussed above these potentially include:

- Urban Stormwater
- Wet Weather Sewer Overflows
- Acid Mine Drainage
- Upstream Sewer Overflows from other Communities
- Wildcat Sewers – Areas with Sewers, but no treatment
- Failing Septic Systems
- Agricultural Loads

Wet Weather Overflows are only one of many sources that PaDEP and the municipalities must address to meet water quality standards. The Concept Plan alone cannot meet water quality standards. If the above pollutant sources were significantly reduced, it is not clear that standards would be met with the Concept Plan. The watershed approach, discussed below, is suggested as a way to address these issues holistically.

Watershed Approach and How to Prioritize the Program

Key Finding: *Much of the work to date has been in response to isolated regulatory requirements imposed in permits and orders. In contrast, a watershed approach seeks to determine what uses in the watershed are most important to stakeholders and how they can best be addressed and funded. Watershed planning ensures that community preferred actions and improvements would be given priority, within the context of regulatory requirements. It is the recommended approach to setting priorities for the LTCP. In addition, such an approach could significantly change the degree to which SSOs, CSOs, stormwater and other loads are addressed overall and from basin to basin. Stakeholders in the watershed must be involved including, political leaders, public interest groups, pollution control entities and regulators.*

The current driving force for the Concept Plan is regulatory enforcement. There will always be a regulatory aspect to these programs. However, an alternative approach to find solutions to water quality issues is the Watershed Approach. The watershed approach was put forth by the EPA in the late 1990s as the preferred method of handling the large variety of point and non-point source pollution that impact the nations water ways. This process involves the cooperative efforts of the varied interested parties (stakeholders) in the development of a unified approach to solving the water quality problems and improving water uses in an area. Through the process, many complex issues can be integrated, assessed and prioritized. Once this is done an action plan for

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achieving meaningful water quality improvements within the basin can be developed by the stakeholders. It is a process where many varied interests are brought together for the common goal of improved water quality.

The Basin groups currently organized by the Three Rivers Wet Weather Demonstration Program (3RWWDP) could form the nexus for taking the watershed approach. Typically the watershed stakeholders are those with the greatest interest in achieving benefits from the investments made. The watershed approach can be described as three phases:

Stage 1 - Identify Challenges and Objectives - Identify concerns, valued watershed features, seek and analyze data, prioritize challenges and opportunities, determine critical areas and establish objectives.

Stage 2 - Develop a Plan - Select management alternatives, including the types of actions to be taken, with stakeholders' input.

Stage 3 - Implementing and Evaluating - Prioritizing actions, funding the actions, implementing, measuring success and further needs.

There are several reasons the watershed approach should be considered for the LTCP. These include:

- There are a variety of water quality impacts from a wide range of sources that need to be addressed in Allegheny County. The regulatory approach cannot address these sources holistically.
- It is essential to gain the support of the people who will pay for the actions and improvements. The watershed approach lets the stakeholders determine what is important to implement first. Priorities can and should be driven by the watershed approach.

There are a number of entities that could lead the watershed approach. See the Institutional issues below for a discussion of institutional issues.

The Concept Plan takes the approach that all SSOs will be eliminated, but only 85% of the wet weather combined area flows must be eliminated. This approach does not account for differences in receiving water conditions. Some waters may require higher or lower levels of protection under a watershed approach. To some extent these differences in control needs can be addressed within facilities plans to be completed in each basin. However, ALCOSAN should be open to considering a redistribution of its capacity and potentially the expansion of its tunnel system in the next phase of planning.

Data examined under this review indicate that fecal coliform (the principal criteria used to assess public health risk to people in contact with the waters) regularly exceed acceptable levels. Rough-cut calculations further indicate that, while the Concept Plan will provide benefits, the Plan will not achieve compliance with Water Quality Standards. There is a need to conduct detailed assessment of the water quality. This assessment needs to go beyond stream monitoring to identify pollutant sources impacting water quality with particular attention to public health risks. This should be done on a watershed basis.

Affordability

Key Finding: Even without the complete costs to the Partner Communities included, the Concept Plan calls for investments in excess of the resources of many of the Partner Communities. Alternative methods of funding are needed.

As discussed above, the Concept Plan does not include all the costs needed for addressing wet weather overflows or meeting dry weather water quality standards. As such, care should be taken in discussing the affordability of the plan, as ratepayers or others will have costs attributable to the solution for each watershed that are not identified in the plan. However, even without considering the total costs, the cost of the Concept Plan would be unaffordable to many of the communities under EPA criteria.

How to Pay

Key Finding: There is a need to evaluate and develop alternate methods of funding.

The following methods of funding infrastructure improvements and Operations and Maintenance (O&M) costs are available:

1. Fund all costs through ALCOSAN's present rate methodology; i.e., prorating costs on water consumption.
2. Adopt a "Pay to Play" concept; i.e., base rates on an actual cost of service for gallon treated but bill individual Partner Communities based on their flow.
3. Use ad valorem or "sin" taxes to fund capital improvements while selecting either Item 1 or 2 above to fund O&M costs.
4. Impervious area fee approach to fund capital O&M costs. Under this approach, fees would be charged proportional to the amount of impervious areas (such as paved surfaces and roof top) included in a real estate parcel.
5. County, State or Federal Grants.

Based on the nationwide trends for funding these programs, the ultimate solution is likely to be a combination of these methods and the combination may vary depending on ultimate institutional arrangements. In addition to funding sources, there are multiple means of raising capital money. These include the State Revolving Fund loans, general fund municipal bonds, revenue bonds, and cooperative municipal bonds. Whatever means of obtaining capital, there will be a need to address the "how to pay" issue first.

Institutional Issues

Key Findings: *To take advantage of potentially significant economies of scale in terms of collection system management and compliance with existing and future water quality regulatory requirements, the Partner Communities will have to restructure themselves. Unless a move toward regional management and operation is made, the wet weather difficulties of today may never be fully resolved. Funding from ALCOSAN and grant funding at the County, State, and Federal levels is essential to optimizing future regionalization opportunities.*

The resolution of wet weather discharges for ALCOSAN and the satellite system must address the following institutional issues:

- Operational and financial responsibility for systems with cross-jurisdictional boundaries.
- Significant variations that exist with respect to the condition of the collection systems.
- Significant variations in terms of peak per capita flow rates exist among Partner Communities regardless of whether they have separate or combined collection systems.
- Legal practicality of existing and future inter-jurisdictional arrangements.
- Development of inter-jurisdictional agreements on a rational basis such as by drainage basin.
- Delineating a specific role for 3RWWDP and the basin groups in developing a control plan.
- Should the Partner Communities singularly or in groups develop their own plan(s) or should they be part of an overall ALCOSAN service area control plan.
- The need to address affordability for low MHI jurisdictions due the interdependence of the collection systems and receiving water.
- The current regulatory and enforcement approach requires each of the Partner Communities regardless of size to address each regulatory requirement. This produces a proliferation of sewer management programs that are too small to be efficient and, as a practical matter, able to respond to the complex regulatory environment.

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These issues should be addressed in a phased approach which is described below.

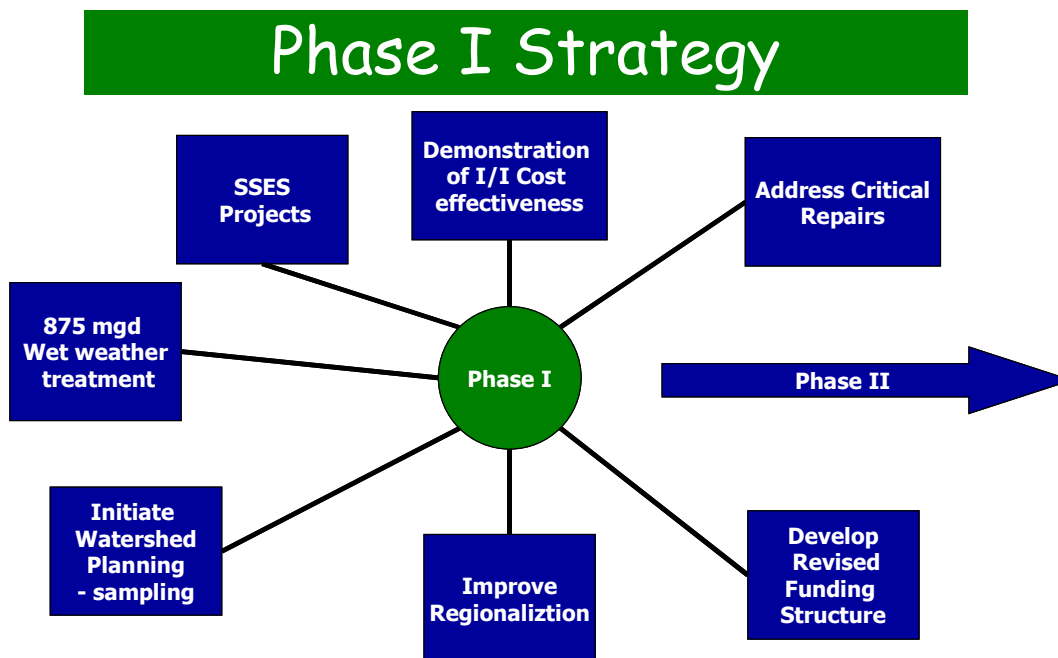
The Path Forward – What the Communities, the Regulators and ALCOSAN Need to Do

Take a Phased Approach

In order to address the issues raised above, a phased approach is recommended as follows:

Phase I

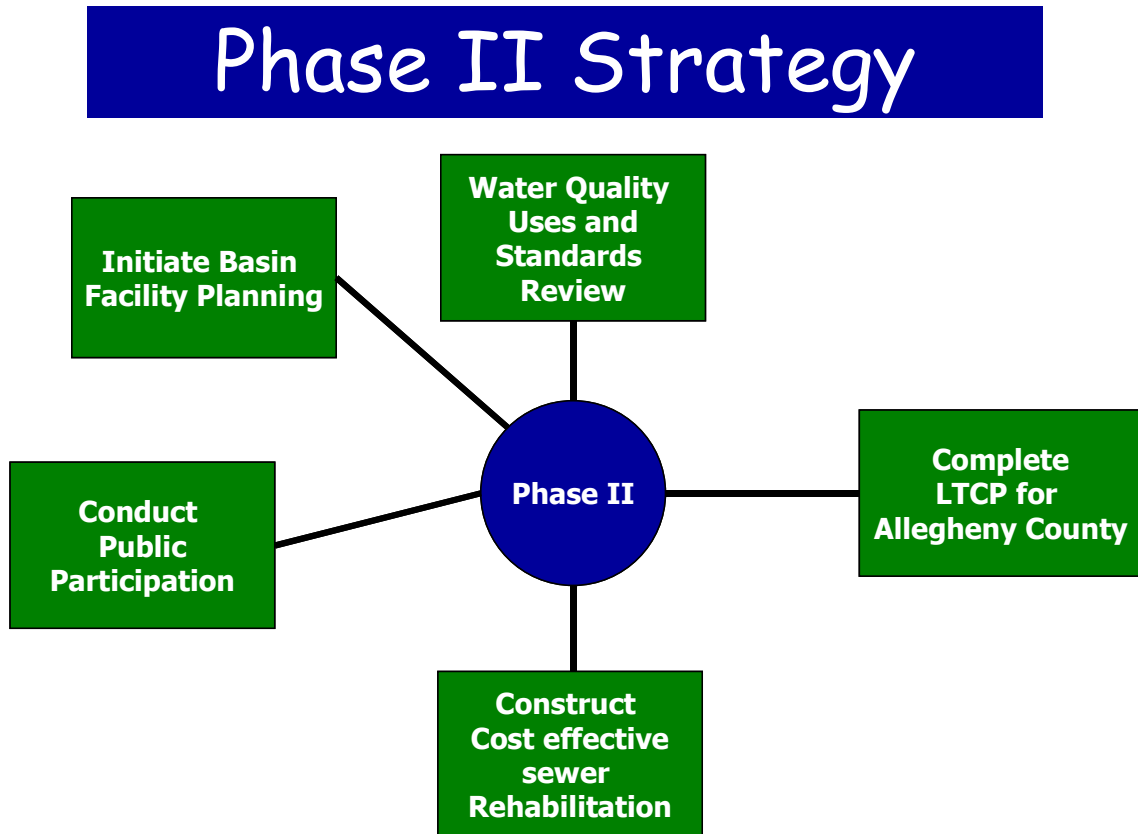
- Implement the portions of the Concept Plan that are clearly cost effective and that will be part of any final plan for the region (such as expanding the wet weather capacity of the WWTP).
- Proceed to inspect priority areas of the collection system and correct structural deficiencies. This could include the beginning of an SSES process.
- Gather the information needed to complete comprehensive facilities plans designed to achieve appropriate water quality standards. Principal among the information needed is to demonstrate I/I control cost effectiveness.



- Conduct a comprehensive Financial Capability Analysis and a revised funding strategy.
- Set up and put into motion a process to determine the ultimate wet weather water quality requirements.
 - Establish organization and structure for final LTCP development and facilities/watershed planning group(s).

Phase II

- Implement additional abatement projects identified as a result of the system inspections. Utilize the information collected to prepare facility plans for each of the watersheds under the umbrella of a LTCP process. Address the ultimate wet weather designated uses and Water Quality Standards to be attained. Conduct a full public participation program.



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Phase III

- Implement the LTCP actions identified and prioritized in accordance with a Watershed Approach.

In order to move forward with this phased approach it will be necessary to make certain institutional changes. A framework for beginning those changes is described as follows:

A Framework for Deciding the Institutional Changes

In order to develop a workable approach to the wet weather issues in the Partner Communities, the following realities must be acknowledged:

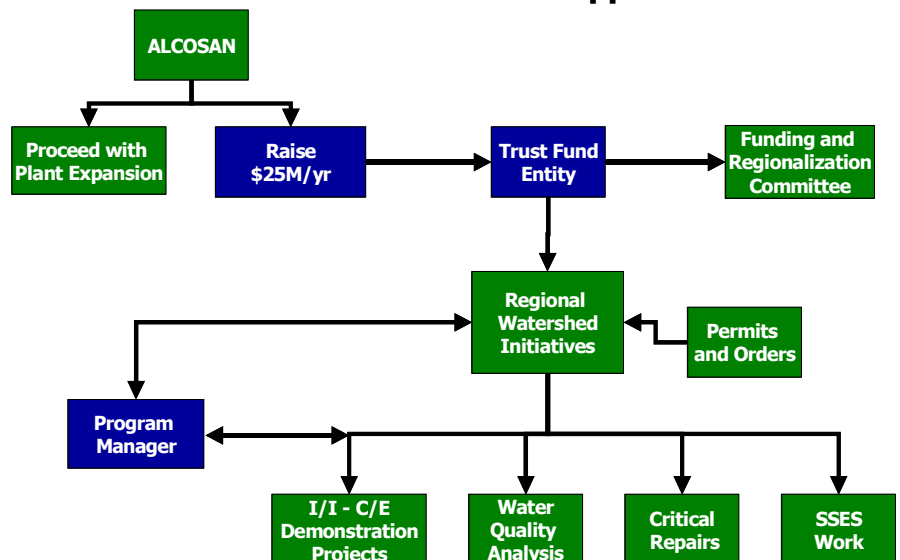
- That sufficient data does not exist for the Partner Communities to develop control plans that address water quality standards and are cost effective.
- That it is impractical for each Partner Community to develop the necessary data in a usable format; i.e., some degree of consolidation is necessary. Enforcement actions must recognize this need.
- There is a need to manage these efforts under a study coordinator. The coordinator could be administered by ALCOSAN, PWSA, 3RWWDP or one of the regional authorities that have significant technical and management resources for the task. This coordination is needed to provide economies of scale and to ensure that priority problems are addressed.
- The regulators will require real progress in the near future.
- A source of immediate funds is needed which will necessitate the short-term use of a funding method that may not be acceptable to the jurisdictions in the long-term.

If these items are accepted, the following institutional tasks must be accomplished:

Immediately

- Determine an immediate source of short-term funds. ALCOSAN should consider being a principal source. A trust funding level of \$25 million per year is suggested.
- Establish a Trust Fund Entity with a board of stakeholders to approve the distribution of funds. Consider including on the board, Partner Community representatives, regulators and impacted

Phase I Recommended Approach



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- environmental and public interest groups.
- Select a Program Coordinator to facilitate and coordinate the Regional Watershed Initiatives of each of the Partner Communities. Facilitate the activities of a Trust Fund Entity to distribute funds to Watershed Initiatives that accomplish the goals and needs under Phase I. These watershed efforts will initially include the first stages of an SSES program, rehabilitation demonstration projects to provide cost effectiveness data to facility planning in Phase II, Water Quality Analysis and critical sewer repairs.
 - Negotiate Phase I of a multiphase plan with the regulators. It will be imperative for ALCOSAN to convey to the regulators each of the important elements that must be completed, the time needed and the State and Local resources needed to accomplish these tasks. The Core Basin Group has been facilitating negotiations for the Partner Communities. It is important that ALCOSAN and the Partner Communities participate together with each other in negotiating with the regulators.
 - Organization of the Partner Communities into functional groupings to facilitate effective data collection, demonstration projects, SSES work and critical repairs.
 - Develop an infrastructure management system (IMS) to facilitate data handling and priority setting.
 - Establish a Blue Ribbon Funding and Regionalization Committee to begin addressing how the system will be re-organized and managed under Phase II. This group should include people of recognized regional stature sufficient to address the substantial change needed to the current sewer management structure.

Before the Development of a Report and Plan

- Develop a comprehensive on-going public outreach program.
- Develop a long-term financial strategy with Partner Communities agreement.
- Determine if the organization structure used for the data collection will be that used for plan implementation. If changes or improvements are indicated, make the necessary adjustments.

Once a proposed plan that includes both a technical, management and financial strategy has been developed, it needs to be the subject of a significant public outreach effort. Finally, agreement needs to be reached with all jurisdictions before presenting a final plan to the regulators.

It is recognized that the stakeholders have both common and conflicting interests. Historically, this has made working together on this complex problem difficult for everyone. This graphic suggests a framework for starting a process to make institutional changes that will provide a means to resolve these conflicts. It shows the need to establish a trust agency in Phase I. Others could also take on this role initially or in subsequent phases. However, whatever group or entity leads the effort, there is a need to work together more closely and openly than in the past. This is particularly true in dealing with the regulators. If a solution to these conflicts cannot be found, the regulators will take charge. This will not be in anyone's best interest.