



SAM
SEWER AUTHORITY MID-COASTSIDE

City of Half Moon Bay • Granada Sanitary District • Montara Sanitary District

**Intertie Pipeline System
Draft Wet Weather Flow
Management Plan**

***Peer Review
Report***

January 17, 2000

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Mr. Chris Thollaug, Chairman
Board of Directors
Sewer Authority Mid-Coastside
1000 N. Cabrillo Highway
Half Moon Bay, CA 94019

Dear Mr. Thollaug:

The undersigned are pleased to present this Report on our conduct of a Peer Review of the Authority's Draft Wet Weather Flow Management Facilities Plan. This report details our findings on each of the several specific questions you posed in chartering this review. It also offers recommendations for a course of action that we believe is appropriate to control wet weather overflows to meet regulatory mandates and the environmental protection goals of SAM and its member agencies.

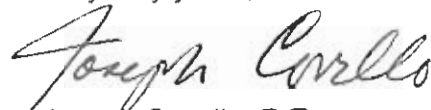
The key findings of our Peer Review of the Draft Plan are:


- The analysis is technically sound and the \$8.7M program is well conceived, within the context of the limited existing data on rainfall and sewer flows in recent years.
- Instead of constructing a \$6.0M project as the initial Phase I of the Wet Weather Flow Management Plan, SAM should launch the program with a \$1,600,000 project (to upgrade the Portola Pump Station and restore the Walker Tank at the Montara Pump Station to provide storage for excess wet weather flows.) This smaller stage should eliminate most overflows, and will integrate into any longer-term future projects.
- SAM should continue to collect flow and rainfall data each winter to support making cost-effective decisions on future stages. This action may enhance future benefits while possibly reducing costs and/or spreading costs over more time.

More detail on our approach and the reasoning behind our conclusions is included in the attached report.


We wish to express our appreciation for the opportunity to serve the Board in this review.

Very truly yours,


Joseph Covello, P.E.
The COVELLO GROUP, Inc.


John A. Burgh, P.E.
Camp Dresser & McKee, Inc.




Gary S. Dodson, P.E.
G. S. Dodson & Associates, Inc.


John A. Larson, P.E.

Sewer Authority Mid-Coastside
Draft Wet Weather Flow Management Program Facility Plan

Peer Review Report

Summary

Beginning in August 1999, an independent panel of experts performed a peer review of the March 1999 Draft Wet Weather Flow Management Program Facility Plan Report prepared by Carollo Engineers. Findings and conclusions of the peer review were as follows:

- The Wet Weather Program is necessary, and the technical approach outlined in the Draft Plan is appropriate.
- Given the limited data available, the flow estimates are reasonable.
- Uncertainty in flow projections argues for a smaller Phase I project than that recommended in the Carollo Report.
- Upgrading Portola Pump Station and recommissioning a tank at Montara Pump Station for peak flow storage could eliminate most of the overflows the system has experienced in recent years.
- This recommended smaller project would reduce estimated Phase I cost from \$6.0 million to \$1.6 million.
- It is important that SAM open a dialogue with Regional Water Quality Control Board soon regarding its proposed wet weather flow management plan.
- SAM should continue to collect system flow data to improve flow projections and the design of future project phases.

Background

This Peer Review was commissioned by the Sewer Authority Mid-Coastside (SAM) Board of Directors in August 1999, to assist the Board in its decision making on a program to control wet weather overflows.

The Authority provides transport and treatment for flows from its three member agencies (Montara Sanitary District, Granada Sanitary District and the City of Half Moon Bay) via a series of pump stations, forcemains and gravity sewers to the Authority's treatment plant in Half Moon Bay. Disposal is via an ocean outfall.

The three-person review team was selected from a slate of six candidates proposed to the Authority by Joseph Covello, the facilitator of the team's work and coordinator of this report to the Board.

The team composition reflects long experience in wet weather sewer system engineering and management in the Bay Area, yet from three different perspectives: John Larson, manager of a local agency's collection system operations and maintenance; Gary Dodson, principal of a Walnut Creek consulting firm prominent in such issues; and John Burgh, a senior engineering manager from an international consulting firm engaged in environmental services.

Draft Wet Weather Flow Management Plan

The Draft Plan that is the subject of this report was prepared for SAM by Carollo Engineers, and is entitled "Draft Wet Weather Flow Management Program Facility Plan Report," March 1999.

Overflows from the Intertie Pipeline System operated by SAM are common in most winter rainy periods. Figure No. 1 on the following page illustrates where overflows were reported in the winter of 1997-98.

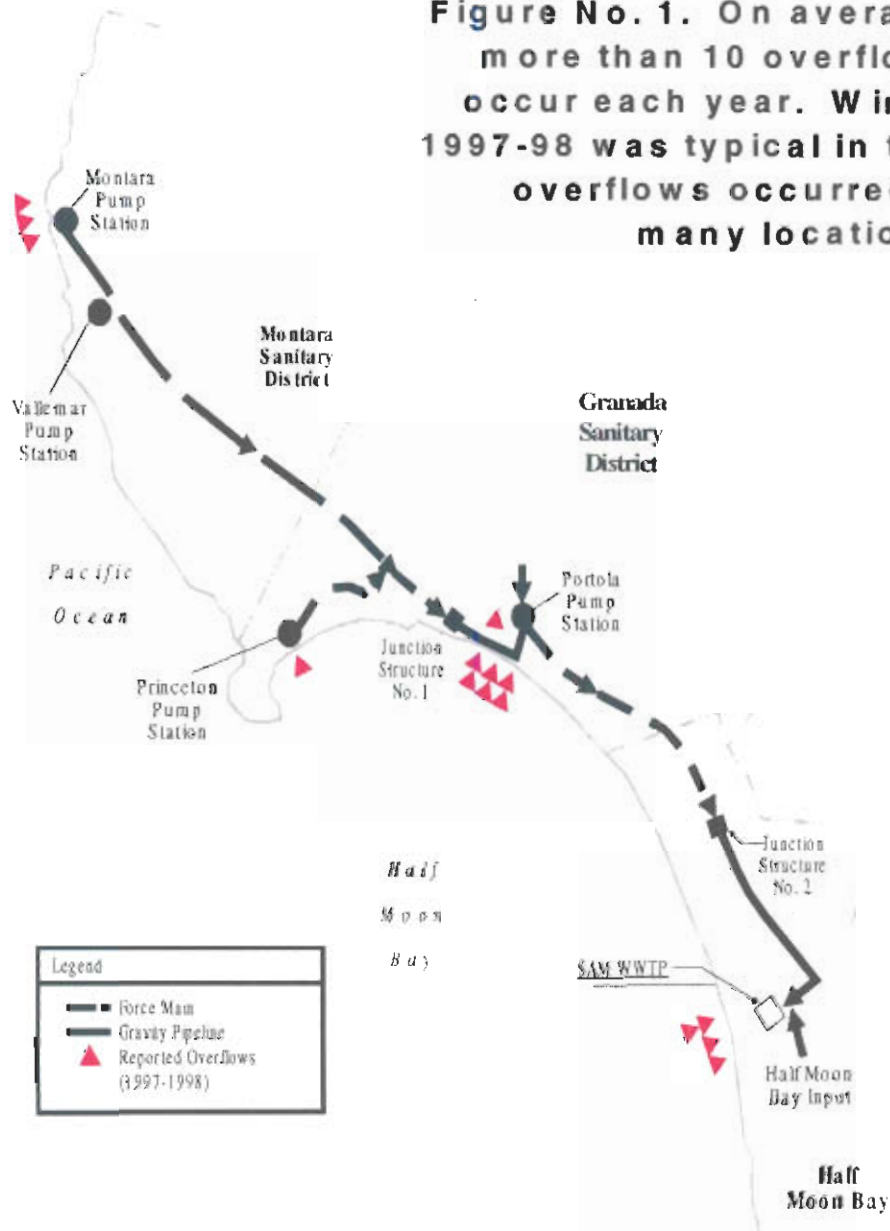
The Draft Plan adopted three goals:

- Maximize use of existing facilities
- Do not exceed the WWTP peak flow capacity of 15.0 mgd
- Contain all overflows during a 5-year design storm

The Draft Report was developed in stages, based on sewer flow data collected in the 1997-98 and 1998-99 rainy seasons. In the "El Nino" winter of 1997-98, 15 overflows occurred in the SAM system. No overflows were reported in 1998-99. The absence of significant storms in that year is a condition seen throughout the Bay Area.

However, 50 overflows from the SAM system have been reported in the past 5 years, suggesting that a no-overflow year is not typical.

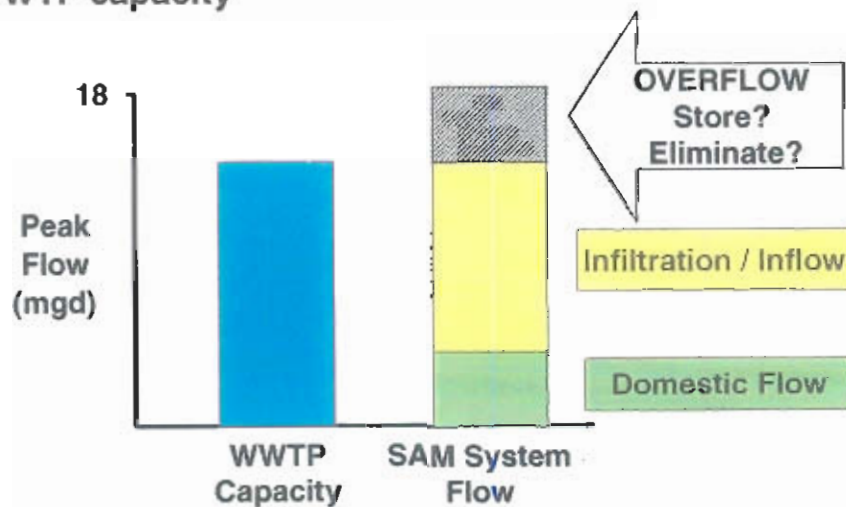
Figure No. 1. On average, more than 10 overflows occur each year. Winter 1997-98 was typical in that overflows occurred in many locations.



From the data collected in this effort it was projected that the peak sewer flow in the Intertie System from a 5-year storm event would be about 18 mgd, as shown in Figure No. 2.

This exceeds the capacity of the treatment plant by 2.8 mgd, which is a measure of the

Figure No. 2. The 5-year event produces 2.8 mgd more than Intertie and WWTP capacity



overflows to be expected if no improvements are made.

Two alternatives (No. 2 and No. 3) were identified in the Plan as the most promising.

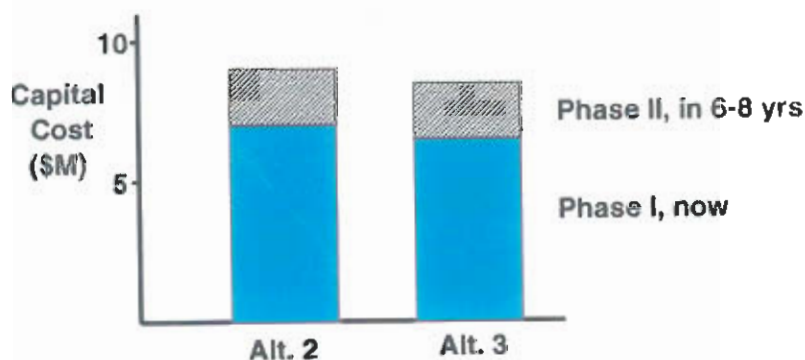
Figure No. 3 illustrates that they are roughly equal in cost, within the estimating accuracy which is possible at the planning stage.

They are also similar in technical features; the principal difference is the way in which additional capacity is provided at the Portola Pump Station.

Alternative No. 2 includes a major wet weather storage tank at the Portola Pump Station, while Alternative No. 3 includes an additional, parallel forcemain south from the Portola Pump Station, making local storage there unnecessary.

The Plan proposes to implement Alternative No. 3 (including the parallel forcemain from the Portola Station) in two phases.

Figure No. 3. The two alternatives are about equal in cost



The composition and estimated cost of each phase is shown below.

Scope of the Peer Review

This Peer Review consists of a review of the Draft Plan, and the studies which immediately preceded it.

This was followed by discussion between the Peer Review team members and a consensus conclusion about the constraints, data, technical approach and findings, compared to customary practices in the profession.

| Phase I Improvements will cost about \$6.0 million | | |
|---|--|-------------|
| IMPROVEMENT | BENEFIT | COST |
| • Montara Storage Basin (Walker Tank) | Reduce overflows at Montara Pump Station | \$ 497,000 |
| • Portola Pump Station expansion and new parallel Forcemain | Eliminate overflows at Portola up to 5-yr storm | 1,026,000 |
| • New Granada parallel forcemain | Eliminate overflows at Portola | 3,748,000 |
| • New metering vault, and replace Junction Structures 1 and 2 | Improve flow metering accuracy, repair corrosion | 352,000 |
| • SAM WWTP Storage Basins (Primary Clarifier #4, Aeration Basin #4) | Eliminate overflow at WWTP from Half Moon Bay | 174,000 |
| • Vallemar and Princeton Upgrades (VFDs only) | Increase efficiency of both pump stations, provide smooth operation of intertie system | 204,000 |
| TOTAL PHASE I | | \$6,001,000 |

| Phase II Improvements will cost about \$2.7 million | | |
|---|---|-------------|
| IMPROVEMENT | BENEFIT | COST |
| • Upgrade Montara pumps | Eliminate overflows at Montara up to 5-yr storm | \$ 319,000 |
| • Storage and wet weather Pump Station at Vallemar | Eliminate overflows at Vallemar Pump Station | 817,000 |
| • New forcemain to Vallemar storage tank | Eliminate overflows at Vallemar | 1,174,000 |
| • Storage and wet weather Pump Station at Princeton | Eliminate overflows at Princeton up to 5-yr storm | 352,000 |
| • SAM WWTP Storage Basins (Primary Clarifier #4, Aeration Basin #4) | Eliminate overflow at WWTP from Half Moon Bay | 174,000 |
| TOTAL PHASE II | | \$2,702,000 |
| TOTAL FOR BOTH PHASES | | \$8,703,000 |

Methodology

The procedure used was for one team member to review the flow data and its analysis, and how that defined the problem. A second member concentrated on the planning aspects and development of alternatives to provide the necessary additional capacity. The third member focused on assessing the operational efficiency of the existing system, seeking ways that greater effective capacity could be obtained from the existing system, in part through the capabilities of the control system which was upgraded in the recent treatment plant expansion project.

Each member reported informally to the team, and after group discussion, a consensus position was reached on each issue, and on how each one related to the 12 questions posed in the scope of work for the review. This report summarizes that work.

It should be emphasized that this Peer Review does not include detailed verification of work done by Carollo Engineers, SAM itself, or the Member Agencies and their respective engineers in support of the Facility Plan. Time and cost limitations precluded such an effort. The value in this review is an unbiased, independent examination of basic assumptions, methods and conclusions, and of the recommended strategy in the Draft Plan for implementing the program.

Findings

The findings of the Peer Review Team in response to each of the 12 specific questions posed by the Board in the commissioning this review, are listed below.

Is the wet weather program necessary? *Yes. Overflows violate state and Federal law, threaten public health and the environmental protection goals of SAM and the Member Agencies. Both Federal and State agencies are in the process of increasing scrutiny and penalties for wastewater overflows. SAM has already been the target of a citizen's suit for overflows. More stringent standards can be expected in the next five years or sooner. This means that SAM, the two Sanitary Districts and the City all will incur regulatory and financial liabilities if wet weather overflows continue.*

Does the technical methodology represent a reasonable study approach? *Yes. The alternatives shown in the Draft Plan represent a reasonable, well-crafted program.*

Is the scale of the proposed alternatives (No. 2 and No. 3) commensurate with the problem? *Maybe. It depends on further work, which we recommend SAM undertake.*

Due to the impact on public beaches, is the RWQCB likely to want more than a 5-year storm as the basis for design? *This is unknown, but will be resolved via a dialogue on*

the Plan with the Regional Water Quality Control Board. We recommend this dialogue be initiated by SAM.

What environmental factors could present obstacles to implementation of any plan? *In our opinion, the report does a good job of identifying these risks.*

Are the 5-year storm flow projections reasonable and consistent with accepted design practice? *Yes, but the flow data are so limited that the facilities may possibly be oversized, and therefore cost more than necessary.*

Are the conclusions commensurate with the evaluation effort? *Yes. Given the short time made available for flow data collection, and the fact that 1998 was an unusually dry winter throughout the area, only very limited flow data are available. Projecting future sewer flows and capacity needs based on such limited data is inexact, and must necessarily be conservative.*

Is Phase I too large? *Yes. We believe that a smaller project can dramatically reduce overflows at a lower initial cost. Building facilities which will be fully used in future phases of any alternative is a better way to launch the program. This strategy would also permit the critical additional data to be collected, so that Phase II can be crafted and timed more accurately for real needs.*

Should there be more phases to measure the effect of each phase on the problem and goal of the program? *Yes. A smaller initial project could spread out costs over more time, and the additional data collection may enable future facility costs to be reduced.*

Is it reasonable to expect that an aggressive infiltration / inflow mitigation program could change the cost, scale or schedule of the solution needed? *It is possible that I/I mitigation efforts could affect the design of future phases. It will still be necessary, however, to implement a Phase I project to reduce the present level of overflows. The reduced Phase I that we recommend would allow for better evaluation of I/I mitigation effectiveness before future phases proceed. The Member Agency I/I rehabilitation programs are sound, and should be continued. Brief comments on these efforts are contained in the Appendix.*

Are there other feasible alternatives that should be considered? *In the opinion of the Peer Review team, the Draft Plan is creative, and considered all reasonable methods of addressing the future capacity needs which have been estimated.*

What further evaluation or analysis should SAM do before proceeding to the CEQA and design phases? *We recommend collecting local sewer flow and rainfall data every winter. This may enable costs to be reduced and/or spread out over more time.*

Although not a specific question posed by the Board at the outset of this Peer Review, the team noted that some modifications to the collection system as presently configured

would likely be beneficial. These comments have been informally passed on to the Authority staff and to the Member Agencies' respective engineers.

Conclusions

The Peer Review has concluded:

- The Wet Weather Program is necessary, and the technical approach outlined in the Draft Plan is appropriate.
- Given the limited data available, the flow estimates are reasonable.
- Confidence in making the major decision on whether to build a large storage facility at the Portola Pump Station, or to increase downstream capacity by building a parallel forcemain, is impaired by the limited flow data and the resulting uncertainty in projecting future flows. This argues for an initial project which enables the Board to defer the storage-versus-forcemain decision until the projections can be made more accurate through more data.
- Since upgrading pump capacity and optimizing controls of the Portola Pump Station, and restoring the Walker Tank in Montara to service for wet weather storage are elements in both alternatives, they are a logical initial project.
- Information in the Draft Plan suggests that this initial project may reduce overflows from the average 10 per year at present, to about one per year. Thus, spending about \$1,600,000 (20 percent of the estimated ultimate Plan cost) would reduce average overflows by 90 percent.
- The Regional Water Quality Control Board must endorse the program, which is likely to become a part of future NPDES permits to the Authority or the Agencies. It is therefore important that SAM open a dialogue with RWQCB soon.
- On-going efforts to obtain more reliable data for predicting future capacity requirements is key to reducing future costs and assuring that only those facilities truly necessary are built, and built no sooner than needed.
- It is essential that sewer flows be monitored at key locations, and that local rainfall be recorded during wet weather. Also, as noted in the Draft Plan, it is important to verify the structural condition of a number of gravity pipelines, to assure that cost estimates are realistic.

The Peer Review Team Recommends Action

The Peer Review team recommends that the SAM Board move ahead with implementation through a refinement of the strategy outlined in the Draft Plan:

- Open a dialogue with the RWQCB on the Agency's Draft Plan
- Maintain flexibility for future steps by focusing immediately on a smaller Phase I project recommended here
- Continue to collect quality flow and rainfall data to validate and/or reduce and spread out future costs
- Begin implementation of the CEQA and design process, for the smaller Phase I project

Acknowledgements

The Peer Review Team wishes to acknowledge the cooperation and support rendered by the Authority management and staff, Carollo Engineers, Kennedy/Jenks Consultants, and Nute Engineering, all of which contributed to the efficiency of our work.

APPENDIX

NOTES ON CURRENT INFILTRATION / INFLOW ABATEMENT EFFORTS OF SAM MEMBER AGENCIES

The wastewater collection system within each of the Member Agencies' service area is owned and operated by the respective agency. Each of the agencies has recognized an appreciable I/I problem in these local gravity sewers, and is taking steps to reduce the extraneous flow – which use up capacity that otherwise would be available for conveyance of sanitary flows - that enters their system during storms.

Sewers deteriorate with age. This means that I/I inevitably becomes more severe unless regular measures are taken to restore integrity of the pipes and (especially) their joints and manholes. *Thus there is no such thing as a sewer system that does not require regular structural repair and restoration.* The steps taken by member agencies to control their local overflows are an important contribution to addressing the overall problem, and are essential for public health protection and regulatory compliance.

The SAM system capacity is adequate for present and projected future dry weather flows. However, some I/I (such as infiltration from ground water) occurs even in dry weather. Therefore, reducing I/I reduces the flow to be pumped and treated all year, helping to control operating costs to the SAM partner agencies. For all these reasons, a regular effort at I/I control in the local sewers helps avoid customer rate increases.

I/I rehabilitation of sewers consists of various methods of sealing up points of entry of extraneous flow (ground water or surface runoff) which presently leaks into the sewers during storms. The coastside community sewers are very typical of Bay Area systems of their age: the wet weather peak flows are many times higher than the true sanitary flow. Where this condition causes the sewer capacity to be exceeded, the pipes run full and peak flows tend to overflow from manholes at low points.

Granada Sanitary District

Granada Sanitary District has reported identifying and repairing a major leak which had been permitting a surface stream to enter the collection system. This should free up capacity downstream of that point, perhaps enough to cause a corresponding reduction in local overflows. It will be important to monitor the success of these Granada improvements over the next three winters, as they may greatly reduce the need for – or at least the timing of – the longer-term need for storage at the Portola Pump Station or a new parallel force main from that station, either of which is a costly and intrusive project.

Half Moon Bay

The City has an aggressive program underway to repair or replace some of the local sewers. Their program, the largest of its type ever undertaken by the City, grew out of a systematic inspection and evaluation of the pipelines, to target those in poorest structural condition for repairs first. By 2002, flow data should begin documenting just how effective these measures have been in meeting the common overflow-control goals of the City and SAM.

Montara Sanitary District

Since Montara is at the upstream extremity of the SAM system, local improvements can directly benefit the other (downstream) agencies. Montara's engineers have noted, quite correctly, that the contribution to rainfall-dependent infiltration may also be appearing in the local collection sewers because of leaks in the service laterals, which are largely on private property of (and the responsibility of) each respective customer. The extent to which this exists in the SAM service area(s) has not yet been determined, but other studies in the Bay Area have shown that large reductions in I/I are possible only by requiring or inducing property owners to repair the laterals which they own.

Rehabilitation of Sewers to Reduce Flow from I/I

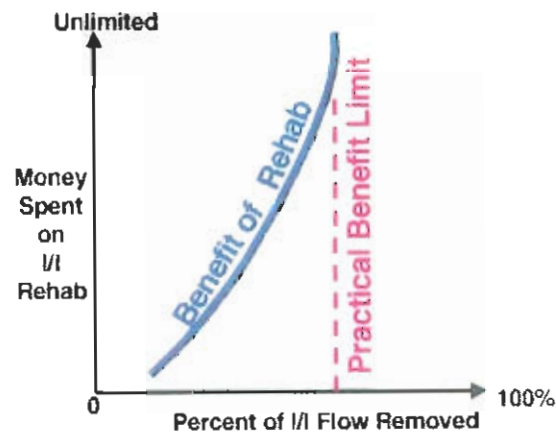


Figure A-1. Rehab success has limits no matter how much money is spent on it, so most Bay Area agencies find a mix of rehab and capacity improvements is the lowest cost solution.

Success at dramatically increasing capacity solely by aggressively repairing leaky sewers remains an elusive answer in California communities which suffer significant I/I

problems. This reality also makes getting regulatory approval of a program based solely on I/I reduction uncertain, perhaps impossible to obtain.

In addition to the high costs, the extensive community disruption of a program focused exclusively on I/I rehabilitation is often a major concern.

Potential Impact on Future Peak Flows in SAM System

Overflows which may now occur in the Agency collection systems act as peak flow relief which limit the flow rate delivered to the SAM system. Therefore local success at sealing up agency sewers, thus preventing local sewer overflows, may have the effect of simply moving those problems downstream, by creating new and even higher peak flows for the SAM system to convey.

To determine the best mix (that is, the mix that produces the lowest cost to the users) better data on existing flows throughout the system is essential. Sizing and cost of SAM facilities needed in the longer-term future are presently based on preliminary estimates of all these factors.

Thus, measures to continue collecting flow and rainfall data (as recommended by this Peer Review Team) are the logical way to move toward this lowest-cost effective system, not only for SAM transport and treatment, but in the local agency capital programs as well.